CustomAir

Vacuum Pumps
Technical Manual

DentalEZ® MAKES YOUR PRACTICE PERFECT®

Vacuum Pumps

Vacuum Pumps

	CV-101 FS	CV-102 FS
Motor		
Power Rating:	1 HP	2 HP
Voltage:	115/208/230	208/230
Amps (each motor)**:**	15/7.5/7.5	15/15
Cycle:	60 Hz.	
Phase:	Single	
Running Speed:	3450 RPM	
Ambient Temperature Range:	10-40°C/50-104°F	
Wire Size:	12 GA.	
Vacuum		
Mercury Pull (Sealed Sys.)**:**	Approx. 20-25" Hg.	Adjust.
Usable CFM:	15	30
Use factor (Number of high-volume hoses open simultaneously)**:**	1.5	3
Water Requirements		
Gallons Per Minute:	1/2	1
Dimensions		
Height:	16"	20"
Width:	12"	14"
Depth:	9"	11"
Shipping Weight:	68 lbs.	78 lbs.

	MC-201 FS	MC-202 FS
Motor		
Power Rating:	1 HP	2 HP
Voltage:	208/230	208/230
Amps (each motor):	7.5/7.5	15/15
Cycle:	60 Hz.	
Phase:	Single	
Running Speed:	3450 RPM	
Ambient Temperature Range:	10-40°C/50-104°F	
Max. Oper. Noise Level:	70-75 dB	
Vacuum		
Mercury Pull (Sealed Sys.):	Approx. 20-25" Hg.	Adjust.
One Pump Operation		
Usable CFM:	15	30
Use factor (Number of high-volume hoses open simultaneously):	1.5	3
Two Pump Operation		
Usable CFM:	30	60
Use factor (Number of high-volume hoses open simultaneously):	3	6
Dimensions		
Height:	23"	
Width:	24"	
Depth:	17-1/2"	
Shipping Weight:	175 lbs.	215 lbs.
Water Requirements		
Gallons Per Min. (per pump)**:**	1/2	1

SPECIFICATIONS

Approvals:

UL/CUL Classified: File E212679

File # 1371

Medical Equipment with Respect to Electric Shock, Fire and Mechanical Hazards Only in Accordance with UL60601-1 and CAN/CSA C22.2 No. 601.1 and IEC60601-1-2

53HN

- Type of protection against electric shock: Class 1 Equipment
- Degree of protection against the ingress of water: Ordinary
- Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Mode of operation: Continuous
- Environmental conditions for transport and storage

  Recommended ranges:

  - Temperature range within - 40° C to + 70° C
  - Relative humidity range within 10% to 100%
  - Atmospheric pressure range within 500 to 1050 hPa

The following Pre-installation information will assist in making a quick, easy and quality installation. However, if there are any questions, contact a CustomAir technical service representative at **1-866-DTE-INFO**.

Site Requirements

Before the Single Wet Vacuum Pump can be properly installed, the following utilities must be available:

Water

Water line must be installed by a plumber according to local building codes. Requirements: 1/2" gate valve reduced to 1/8" FIP.

Waste

Waste line must be installed by a plumber according to local building and health codes. Requirements: reduce connection to 1" FIP or floor sink. When using floor sink, order a floor sink adapter.

Vacuum Lines

Vacuum lines must be installed by a plumber according to local building and electrical codes. Requirements: 1" IPS, PVC, Schedule 40.

Electrical

All electrical supply lines and control wiring should be supplied and installed by a licensed electrician according to local building codes.

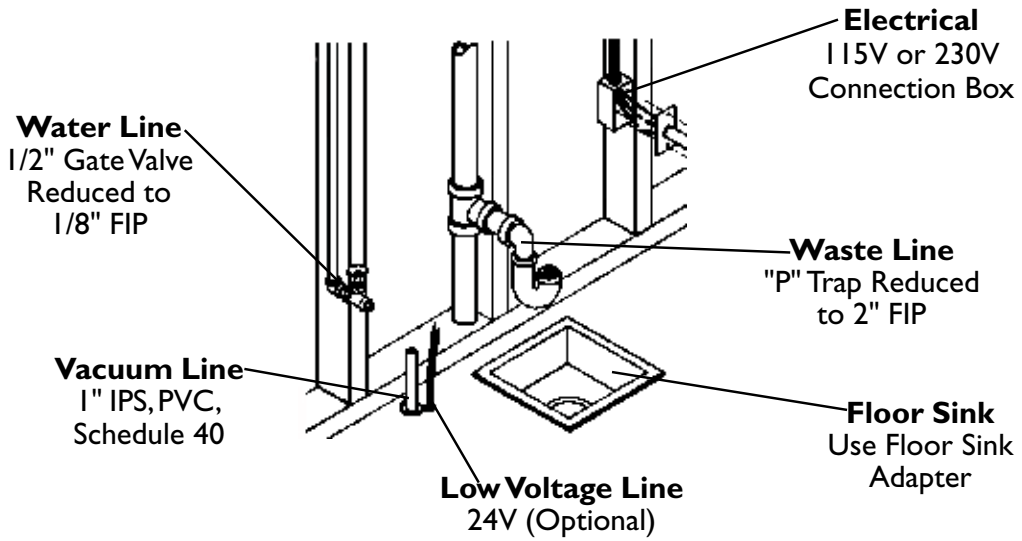
Electrical Requirements

Volts	Model CV-101 FS*	Model CV-102 FS
115V	Wired direct by electrician as per local codes. Separate circuit with 30 amp breaker, single phase.	Cannot be connected to 115V line.
208/230V	Wired direct by electrician as per local codes. Separate circuit with 20 amp breaker, single phase.	Wired direct by electrician. Separate circuit with 30 amp breaker, single phase.

*Model CV-101 FS is manufactured and shipped for 115V operation. This model may be converted to 230V operation by qualified installation technicians only following connection diagrams inside the pump control box.

Low Voltage Control Line (Optional)

If remote low voltage is desired, a licensed electrician should install 18-2 thermostat wire from the pump location to the operatory switches. (Use 18-3 thermostat wire for lighted switch.)



SITE REQUIREMENTS

The following Pre-installation information will assist in making a quick, easy and quality installation. However, if there are any questions, contact a CustomAir technical service representative at **1-866-DTE-INFO**.

Site Requirements

Before the Dual Wet Vacuum Pump can be properly installed, the following utilities must be supplied:

Electrical

All electrical supply lines and control wiring should be supplied and installed by a licensed electrician according to local building codes. **The Dual Wet Vacuum Pump requires two separate circuits** (one for each pump motor) of the correct voltage for the system ordered. In addition to the thermal overload protection built into the motors, each circuit must be provided with a circuit breaker, time delay fuse or standard fuse. See the Motor Protection Chart below for recommended breaker or fuse amperage.

Motor Protection Chart

Protection Type (each motor)	MC-201 FS 230V	MC-202 FS 230V
Circuit Breaker	20 Amps	30 Amps
Time Delay Fuse	12 Amps	20 Amps
Standard Fuse	25 Amps	40 Amps

Low Voltage Control Line (Optional)

If remote low voltage is desired, a licensed electrician should install 18-3 thermostat wire for lighted switch or 18-2 thermostat wire for non-lighted switch from the pump location to the operatory switch located up to 150 feet away. If the operatory switch is over 150 feet away from the pump location, use 16-3 thermostat wire for lighted switch or 16-2 thermostat wire for non-lighted switch.

— IMPORTANT —

All vacuum systems must be installed according to local building and electrical codes.

Water

Water line must be installed by a plumber according to local building codes. Terminate water line in 1/2" FIP gate valve.

Waste

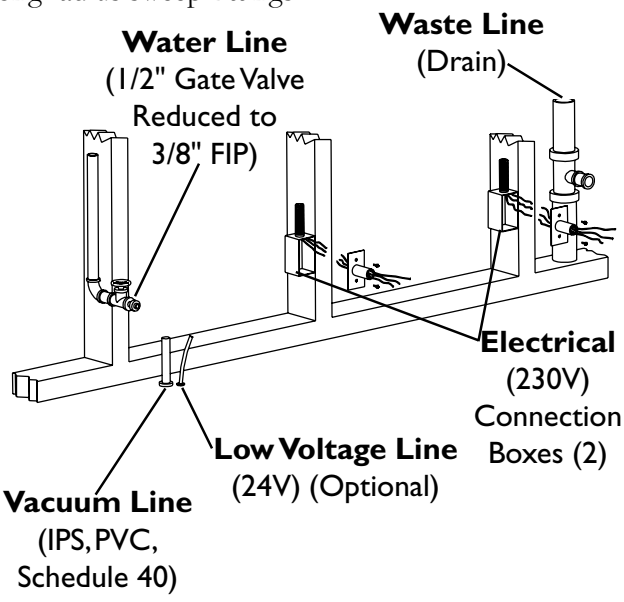
— CAUTION —

A free-flowing discharge system is required for proper operation of the vacuum system. The dual pump may leak at the anti-siphon valve if the discharge system is restricted. Ensure the vacuum system is installed and cleaned in accordance to the instructions in this manual.

Waste line must be installed by a plumber according to local building and health codes. For requirements, see Typical Installation Options, Page 4 and Waste Line, Page 6.

Vacuum Lines

Vacuum lines be installed by a plumber according to local building codes. Vacuum lines and risers to be IPS, PVC, Schedule 40, unless local codes require another material such as copper. Slope all vacuum lines toward the vacuum producer 1 inch for every 20 foot run. Make all vacuum line connections using long radius sweep fittings.



Vacuum Pump Water Consumption Chart

Model #	Gal. per hour w/o recirculator	Gal. per hour w/recirculator
CV-101	30	5 - 6
CV--102	60	9 - 10
MC-201 w/one pump running	30	5 - 6
MC-201 w/both pumps running	60	9 - 10
MC-202 w/one pump running	60	9 - 10
MC-202 w/both pumps running	120	18 - 20
Note: Figures are for continuous operation.		

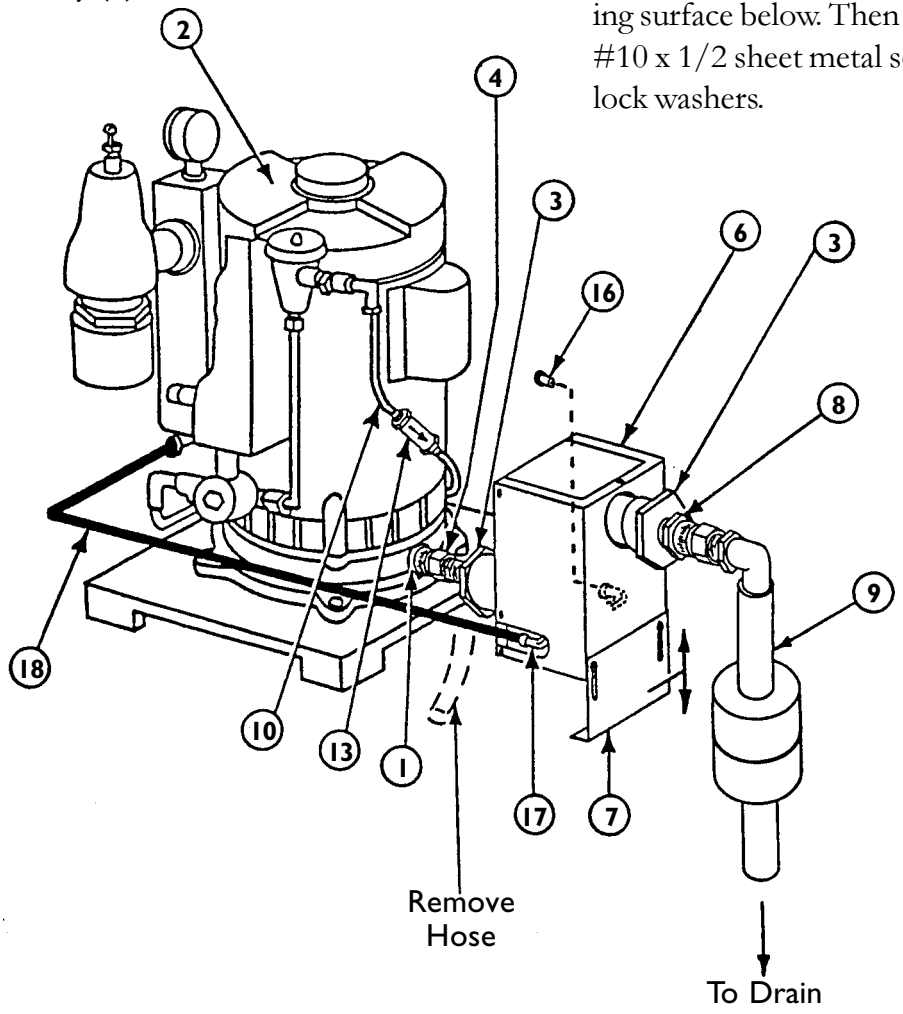
Single Pump Water Recirculator — 64710022C

WARNING: *Before doing any work, turn* ***OFF*** *the main power.*

NOTE: *For convenience, refer to the itemized illustration below during installation.*

Mounting

1. Disconnect the vacuum pump exhaust hose **(9)** from the hose connector **(1)** on the pump **(2)**.
2. Install the reducing bushing **(3)** in the lower inlet opening of the recirculator assembly **(6)**.
3. Install the swivel connection adapter **(4)** in the reducing bushing **(3)** installed in the previous step.
4. Attach the swivel connection adapter **(4)** to the hose connector **(1)** on the pump and align the recirculator assembly **(6)** so that it is vertically in line with the vacuum pump **(2)**. Then securely tighten the swivel connection adapter **(4)**.
5. Align the support bracket **(7)** with the recirculator enclosure **(6)** until the foot pads on the support bracket contact the supporting surface below. Then secure using two #10 x 1/2 sheet metal screws and two #10 lock washers.



RECIRCULATOR INSTRUCTIONS

Pump Exhaust

1. Install a reducing bushing **(3)** in the upper exhaust opening of the recirculator assembly **(6)**.
2. Install a brass 3/4 MIP x G.H.T. **(8)** hose connection adapter in the reducing bushing **(3)** installed in the previous step.
3. Reconnect the existing 1" exhaust hose **(9)** and muffler to the hose connection adapter installed in the previous step.

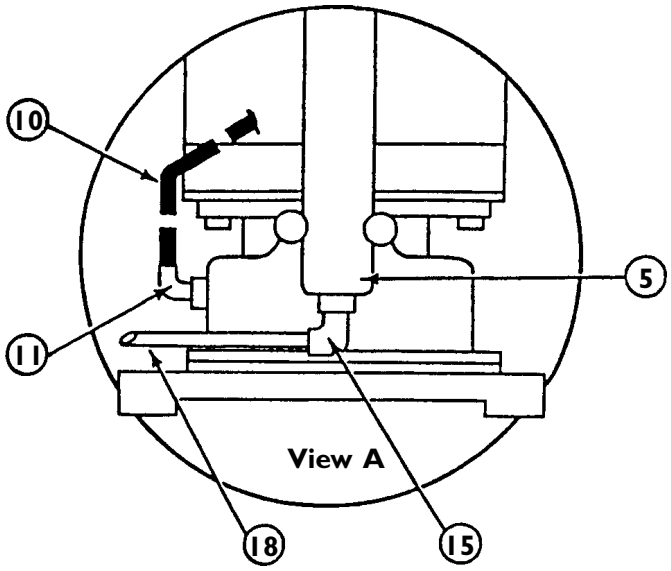
Water Supply

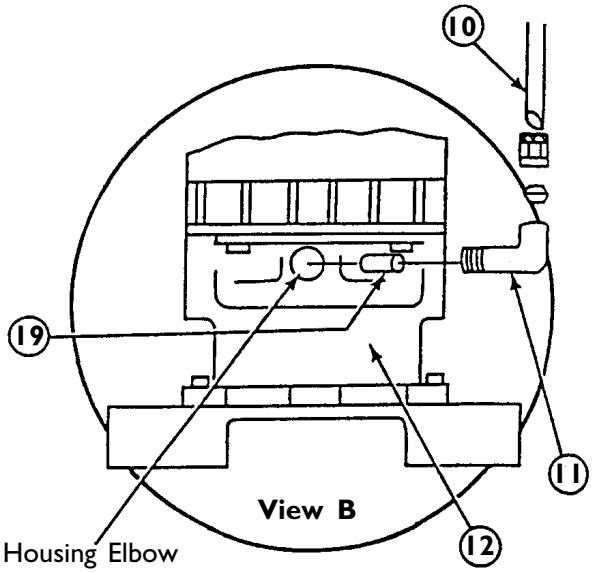
NOTE: *For convenience, refer to the illustrations on the next page for water supply installation.*

1. Remove the 1/4" poly tubing **(10)** from the elbow **(11)**. (Views **A** & **B**) *(On next page)*
2. Remove the elbow **(11)** from the vacuum pump housing **(12)**. (Views **A** & **B**)
3. Insert the sleeve **(19)** into the housing elbow threaded hole. (View **B**)
4. Reconnect the elbow **(11)** to its original position.
5. Assemble two poly tube connection adapters **(14)** to the correct rate flow restrictor valve **(13)** as follows: (View **C**)
   - For a 1 H.P. pump, use a .12 G.P.M. valve.
   - For a 2 H.P. pump, use a .25 G.P.M. valve.
6. Cut the 1/4" poly tubing **(10)** at its midpoint and slip a brass nut and brass sleeve over each cut end of the poly tubing. (View **C**)
7. With the flow direction arrow on the flow restrictor valve **(13)** pointing down toward the pump base, secure the cut ends of the 1/4" poly tubing **(10)** to the connection adapters on the flow restrictor valve.
8. Reconnect the remaining end of the 1/4" poly tubing **(10)** to the elbow **(11)**. (View **B**)
9. Remove the pipe plug from the manifold **(5)** and replace with poly tubing connection elbow **(15)**. (View **A**)
10. Connect the recirculator outlet **(17)** to the manifold elbow **(15)** using 1/4" poly tubing **(18)**. (View **A**)
11. Fully insert the plug **(16)** into the unused recirculator outlet **(17)** on the opposite side of the recirculator assembly **(5)**.

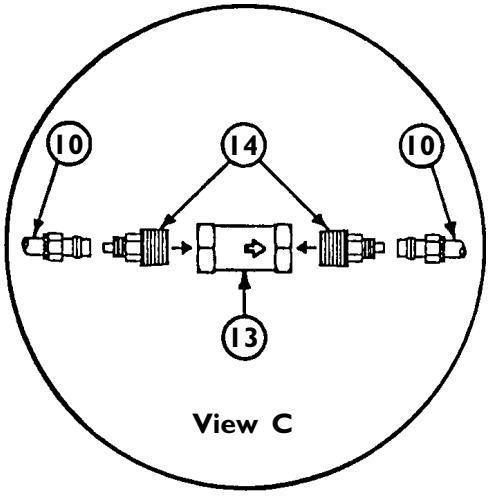
Operation Check

1. After installation is complete, operate the system and check all connections for leaks.
2. Correct leaks as required.





Housing Elbow
Threaded Hole



Dual Pump Water Recirculator

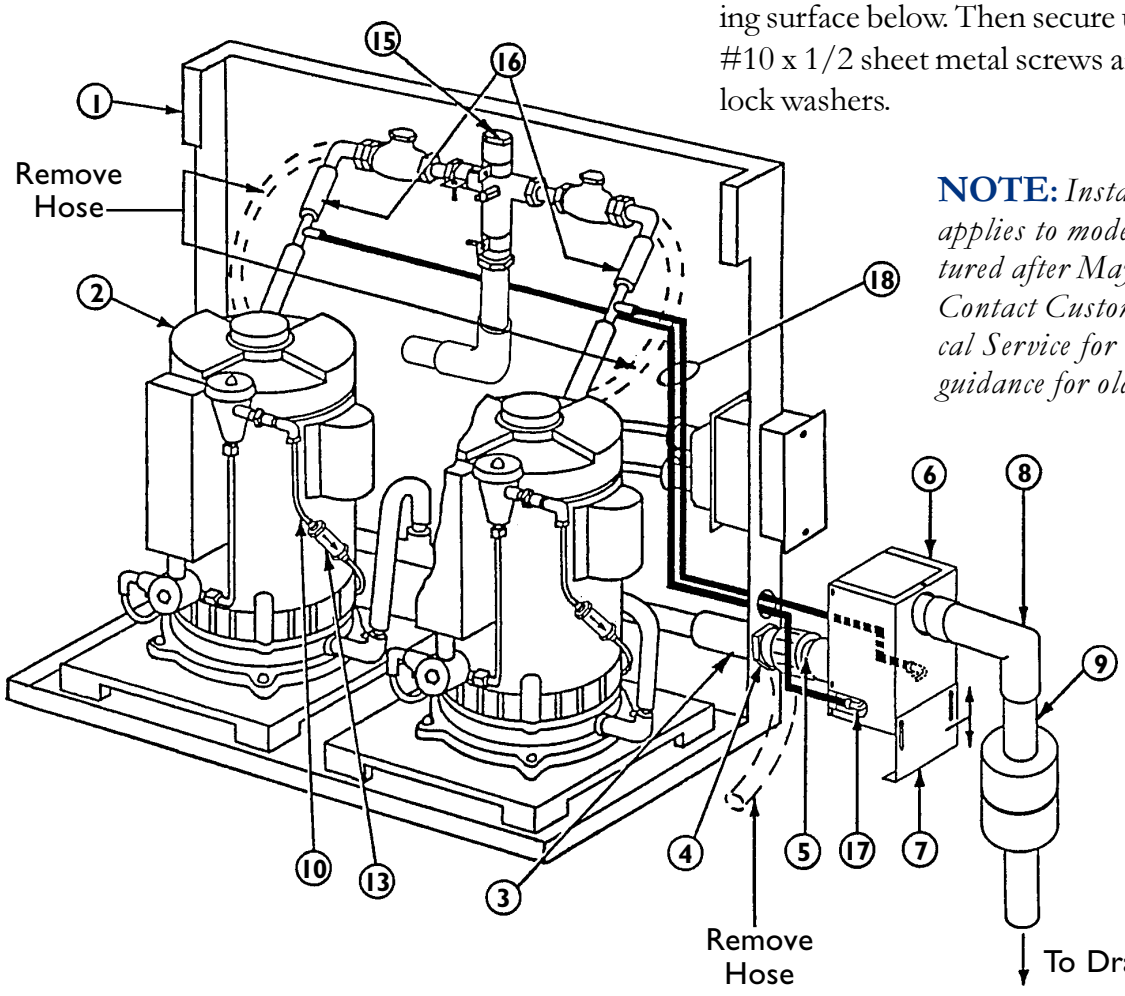
64710012C

WARNING: *Before doing any work, turn* ***OFF*** *the main power.*

NOTE: *For convenience, refer to the itemized illustration below during installation.*

Mounting

1. Disconnect the vacuum pump exhaust hose **(9)** and adapter from the exhaust manifold **(3)**.
2. Install the 1-1/2" male compression adapter **(4)** in the exhaust manifold **(3)**.
3. Install the threaded end of the 1-1/2" pipe nipple **(5)** in the lower inlet opening of the recirculator assembly **(6)**.
4. Fully insert the plain end of the 1-1/2" pipe nipple **(5)** into the 1-1/2" male compression adapter **(4)** and vertically align the recirculator assembly **(6)** with the frame **(1)**. Then securely tighten the compression adapter.
5. Align the support bracket **(7)** with the recirculator enclosure **(6)** until the foot pads on the support bracket contact the supporting surface below. Then secure using two #10 x 1/2 sheet metal screws and two #10 lock washers.



NOTE: *Installation shown applies to models manufactured after May, 1992. Contact CustomAir Technical Service for installation guidance for older models.*

RECIRCULATOR INSTRUCTIONS

Pump Exhaust

1. Install a 1-1/2" elbow **(8)** or 1-1/2" straight hose connection adapter *(not shown--depending on location requirements)* in the upper exhaust opening of the recirculator assembly **(6)**.
2. Reconnect the existing 1-1/2" exhaust hose **(9)** and muffler to the hose connection adapter that is installed in the upper exhaust opening. Then secure using a 1-1/2" clamp.

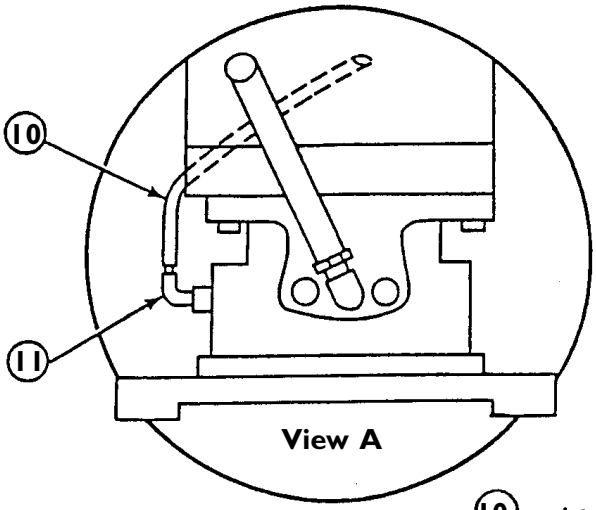
Water Supply

NOTE: *For convenience, refer to the illustrations on the next page for water supply installation.*

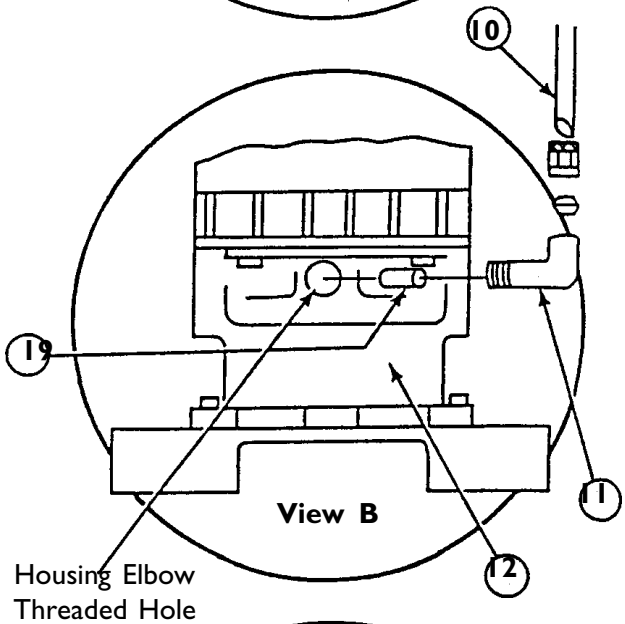
1. Remove the 1/4" poly tubing **(10)** from the elbow **(11)**. (Views **A** & **B**) *(On next page)*
2. Remove the elbow **(11)** from the vacuum pump housing **(12)**. (Views **A** & **B**)
3. Insert the sleeve **(19)** into the housing elbow threaded hole. (View **B**)
4. Assemble two poly tube connection adapters **(14)** to the correct rate flow restrictor valve **(13)** as follows: (View **C**)
   - For a 1 H.P. pump, use a .12 G.P.M. valve.
   - For a 2 H.P. pump, use a .25 G.P.M. valve.
5. Cut the 1/4" poly tubing **(10)** at its midpoint and slip a brass nut and brass sleeve over each cut end of the poly tubing. (View **C**)
6. With the flow direction arrow on the flow restrictor valve **(13)** pointing down toward the pump base, secure the cut ends of the 1/4" poly tubing **(10)** to the connection adapters on the flow restrictor valve.
7. Reconnect the remaining end of the 1/4" poly tubing **(10)** to the elbow **(11)**. (View **B**)
8. Repeat the water supply Steps **1**. through **7**. for the other pump.
9. Remove the 1" hose from the intake manifold **(15)** to the vacuum pump **(2)** (two places).
10. Install the water injector assembly **(16)** between the intake manifold **(15)** and vacuum pump **(2)**. Then secure using 1" clamps (two places).
11. Connect the recirculator outlets **(17)** to the water injector assembly **(16)** using 1/4" poly tubing **(18)** (two places). Then run the poly tubing through the hole that is provided in the rear side wall of the frame **(1)**.

Operation Check

1. After installation is complete, operate the system and check all connections for leaks.
2. Correct leaks as required.

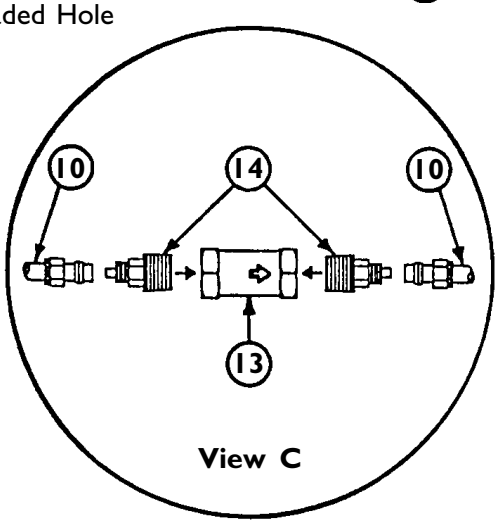


View A



View B

Housing Elbow
Threaded Hole



View C

RECIRCULATOR INSTRUCTIONS

— WARNING —

Before starting cleaning procedures, make certain to put on eye protection, a mask and puncture-resistant nitrile gloves.

Weekly Maintenance

Clean In-Line Filter

Turn **OFF** the pump motors.

Carefully unscrew the lower bowl from the filter top and lift out the screen.

Using water, flush the bowl assembly and any contaminated sediment.

Submerge the screen/bowl assembly into a high-level chemical disinfectant solution. *Follow the disinfectant manufacturer's recommendation for time interval required to achieve disinfection.*

Remove the screen/bowl assembly from the disinfectant solution and rinse using tap water.

Properly dispose of the contaminated sediment and disinfectant solution waste.

Replace the screen and make sure the gasket is in place before replacing the bowl.

Check all connecting vacuum, waste and water lines for tightness.

Inspect Operatory Filters

Check and clean all operatory and secondary filters weekly. *Follow the equipment manufacturer's recommendations.*

Inspect Vacuum System

Check the system weekly for water leaks and loose or broken connections.

Monthly Maintenance

Check Vacuum Level

The vacuum level of the CustomAir Single Wet Vacuum Pump is preset at the factory.

Recommended Operating Vacuum Levels:
10" Hg. General Dentistry
19" Hg. Surgery

The pressure gauge will indicate the vacuum level provided by the pump. If it becomes necessary to adjust this setting, the following steps can be taken:

NOTE: *The evacuator should be left **ON** when setting the vacuum level. Also, make sure all hoses in the operatory are closed.*

Turn the lock nut counterclockwise to loosen.

For greater vacuum level, turn the screw clockwise; for less vacuum level, turn screw counterclockwise.

Set to desired vacuum level and tighten locknut.

Clean Surface

Using a damp cloth, remove any surface dust and dirt.

— CAUTION —

A free-flowing discharge system is required for proper operation of the vacuum system. The pump systems may leak at the anti-siphon valve if the discharge system is restricted. Ensure the vacuum system is installed and cleaned in accordance to the instructions in this manual.

MAINTENANCE

— WARNING —

Before starting cleaning procedures, make certain to put on eye protection, a mask and puncture-resistant nitrile gloves.

Weekly Maintenance

Clean In-Line Filter

Turn **OFF** the pump motors.

Carefully unscrew the lower bowl from the filter top and lift out the screen.

Using water, flush the bowl assembly and any contaminated sediment.

Submerge the screen/bowl assembly into a high-level chemical disinfectant solution. *Follow the disinfectant manufacturer's recommendation for time interval required to achieve disinfection.*

Remove the screen/bowl assembly from the disinfectant solution and rinse using tap water.

Properly dispose of the contaminated sediment and disinfectant solution waste.

Replace the screen and make sure the gasket is in place before replacing the bowl.

Check all connecting vacuum, waste and water lines for tightness.

Inspect Operatory Filters

Check and clean all operatory and secondary filters weekly. *Follow the equipment manufacturer's recommendations.*

Inspect Vacuum System

Check the system weekly for water leaks and loose or broken connections.

Monthly Maintenance

Check Vacuum Level

The vacuum level of the CustomAir Dual Wet Vacuum Pump is preset at the factory.

Recommended Operating Vacuum Levels:
10" Hg. General Dentistry
19" Hg. Surgery

The pressure gauge will indicate the vacuum level provided by the pump. If it becomes necessary to adjust this setting, the following steps can be taken:

NOTE: *Turn On one pump — vacuum level adjustments are made with only one pump operative.*

Turn the lock nut counterclockwise to loosen.

For greater vacuum level, turn the screw clockwise; for less vacuum level, turn screw counterclockwise.

Set to desired vacuum level and tighten locknut.

NOTE: *The evacuator should be left **ON** when setting the vacuum level. Also, make sure all hoses in the operatory are closed.*

Clean Surface

Using a damp cloth, remove any surface dust and dirt.

MAINTENANCE

Model: AM-200

Air/Water or Nitrous Oxide Separator

(PN: 64656200)

Compatible with all single or dual water injected vacuum pumps. Parts provided for unit to be adapted to 3/4", 1" or 1-1/2" exhausts.

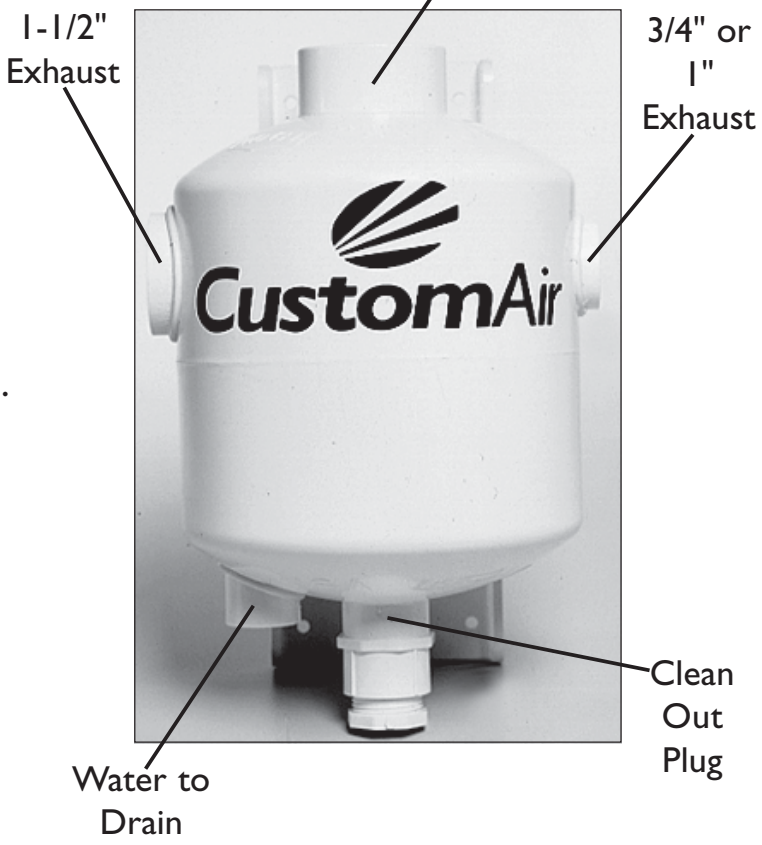
A standard 2", no-hub coupling on the air discharge vent eliminates any adaptor and allows direct hookup to a standard vent pipe.

The water trap is inside, which makes plugging virtually impossible.

The entire separator is made of corrosion-proof PVC plastic.

The separator should be mounted near the vacuum pump with the center of the exhausts inlets on the chamber no more than 2 feet above the bottom of the vacuum pump.

NOTE: *This product should be installed by a competent technician or plumber. The installation should meet all local health and plumbing codes. This device requires a separate atmospheric vent for maximum safety and effectiveness.*



DentalEZ GROUP

2500 Highway 31 South
Bay Minette, Alabama 36507
1-866-DTE-INFO

PN: 64710078C

AIR/WATER SEPARATOR

How is a single pump wired to a remote lighted switch?

— NOTICE —

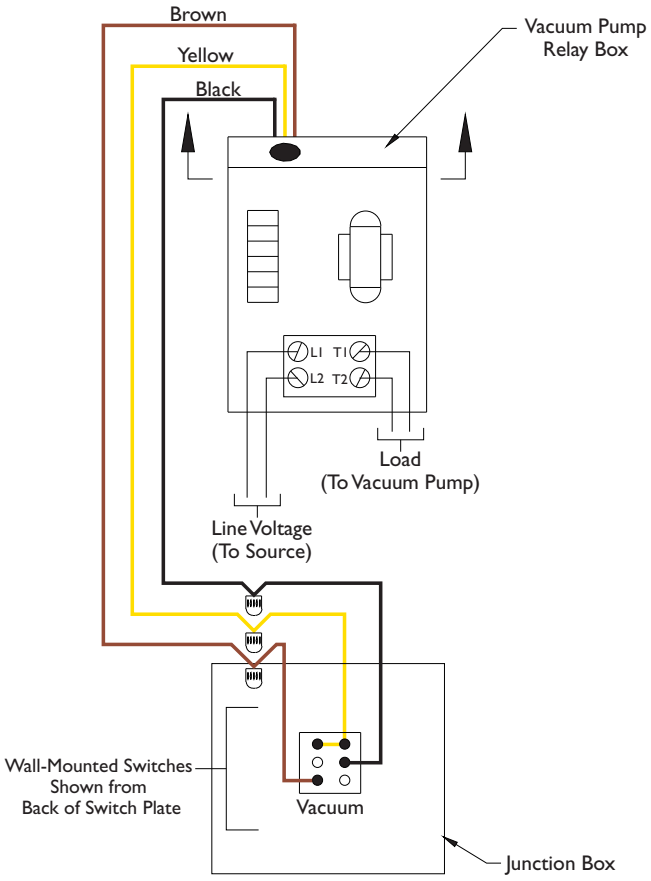
All wiring between the main control box and equipment should be **Class B, low-voltage**. *In most cases, a conduit is* ***not*** *required when using this type of wiring.*

— WARNING —

Before proceeding with any electrical installation, comply with and maintain all applicable local electrical code(s) and regulations.

IMPORTANT NOTE:
If not using a DentalEZ Master Control Panel Kit, proceed as follows:

1. Position the master switch in the desired location.
2. Run the appropriate wires to their respective euipment location. *(See wiring chart below.)*
3. Connect wires according to the wiring diagram on the right.



LEGEND
Brown = Light
Yellow = Return
Black = Power

WIRING CHART

Model No.	No. of Wires	Wire Under 150 ft.	Wire Over 150 ft.
CV-101	3	18 AWG	16 AWG
CV-102	3	18 AWG	16 AWG

CustomAir

FAQ #1

FREQUENTLY ASKED QUESTIONS

How are dual pumps wired to a remote lighted switch?

— NOTICE —

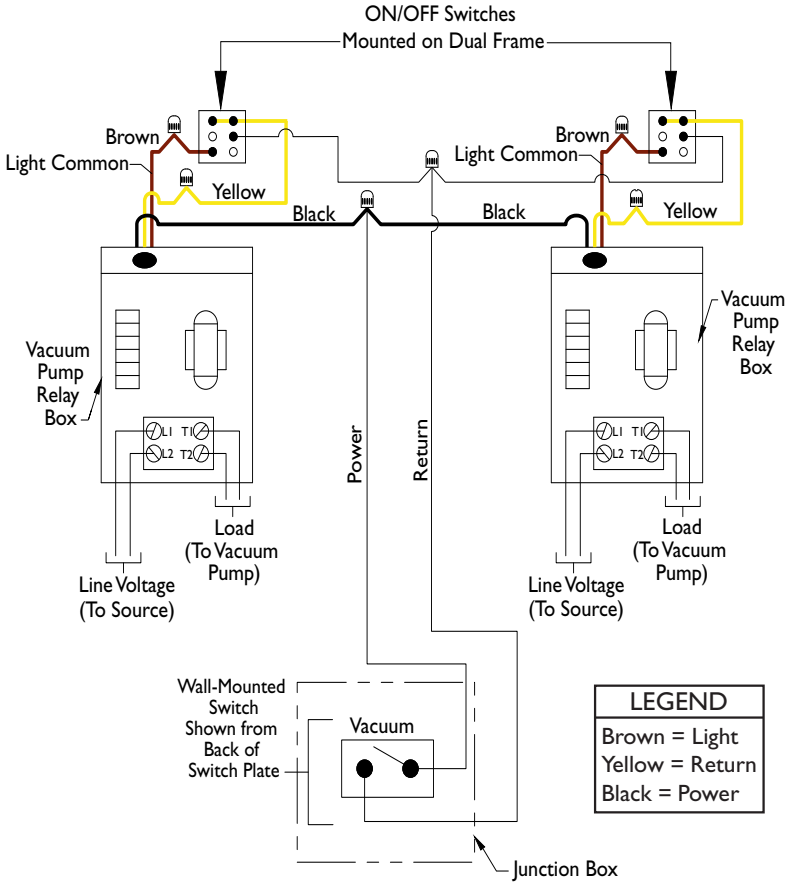
All wiring between the main control box and equipment should be **Class B, low-voltage**. *In most cases, a conduit is* ***not*** *required when using this type of wiring.*

— WARNING —

Before proceeding with any electrical installation, comply with and maintain all applicable local electrical code(s) and regulations.

IMPORTANT NOTE: *If not using a DentalEZ Master Control Panel Kit, proceed as follows:*

1. Position the master switch in the desired location.
2. Run the appropriate wires to their respective euipment location. *(See wiring chart below.)*
3. Connect wires according to the wiring diagram on the right.



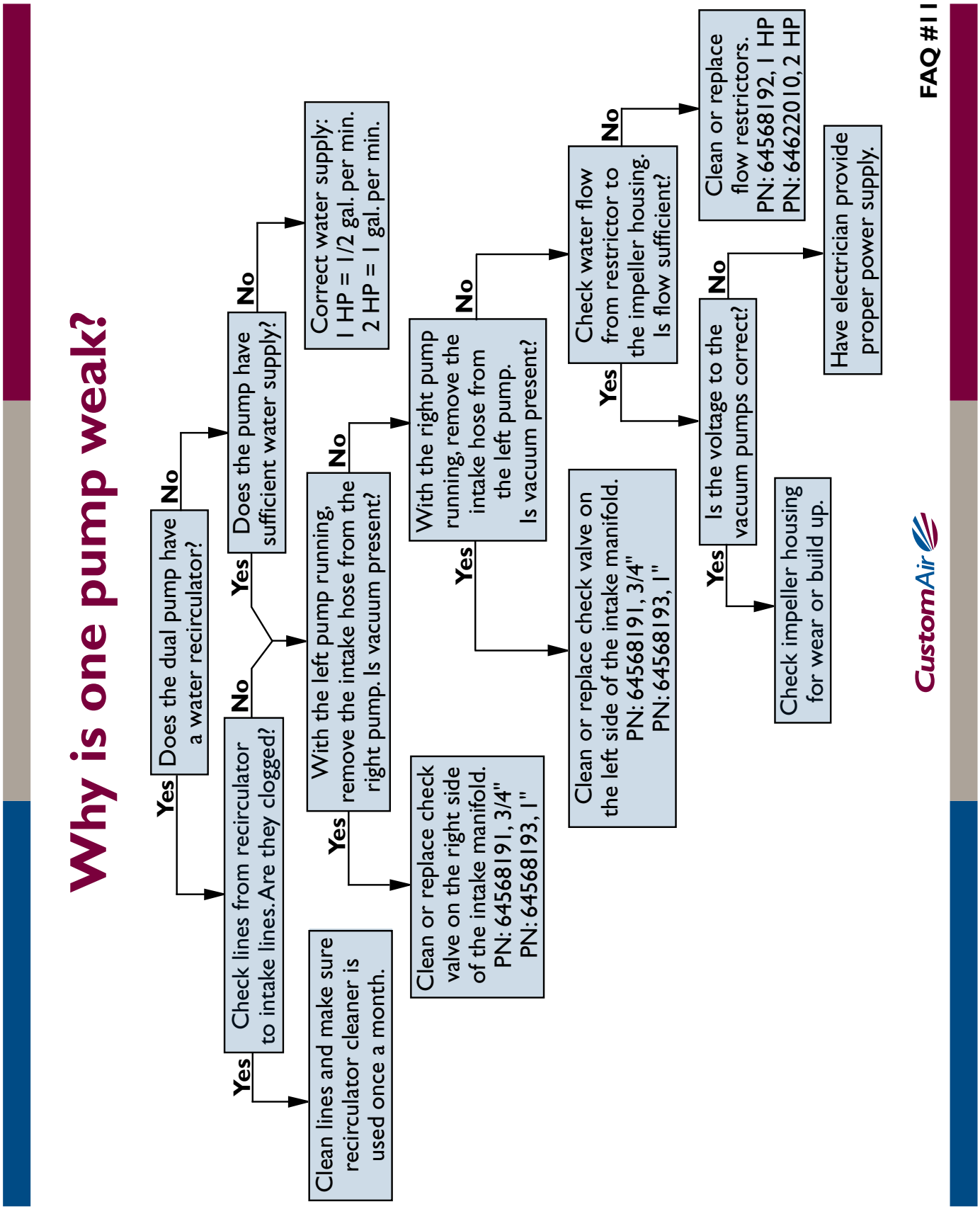
WIRING CHART

Model No.	No. of Wires	Wire Under 150 ft.	Wire Over 150 ft.
MC-201	6	18 AWG	16 AWG
MC-202	6	18 AWG	16 AWG

CustomAir

FAQ #9

FREQUENTLY ASKED QUESTIONS



FREQUENTLY ASKED QUESTIONS

APPLICATION AND CONNECTION DATA FOR BUCK-BOOST TRANSFORMERS

DESCRIPTION

Buck-Boost transformers are insulated units rated 120/240 volts high voltage and 12/24 and 16/32 volts low voltage. When connected as autotransformers in single-phase or three-phase circuits, they can be used to change voltage on loads greatly in excess of the rating shown on the nameplate.

Because autotransformers may transmit line disturbances directly to the load, their use in some areas may be prohibited by local codes.

NOTE: BE SURE THAT AUTOTRANSFORMERS ARE PERMISSIBLE IN YOUR LOCALE.

APPLICATION

Efficient operation of electrical equipment requires that line voltage be at or near the nameplate rating of the equipment. In order to match available line voltage (whether it be too high or low) with equipment voltage, buck-boost transformers provide the most convenient and least expensive method.

Do not use buck-boost transformers to solve a fluctuating voltage problem. They should be used to compensate for high or low voltage conditions only when the available line voltage is reasonably constant.

5-STEP SELECTION

Buck-boost applications are quick and easy to solve when you follow these easy steps.

FOR BOOSTING UP AVAILABLE VOLTAGES:

1. Select the table having the same output voltage as the voltage required for the equipment you want to operate. Example: 230 volt, single phase air conditioner — Table 1.
2. Select the available line voltage column located in that table. Example: 208 volts single phase available (Column 2 — Table 1).
3. Select the proper kVA required by your equipment then read down the available line voltage column until you find it. If your kVA is not listed, go on to the next higher kVA. Example: Air conditioner needs 2.4 kVA volts at 230 volts.
4. Select the transformer number. Read directly left across the model number column. Example: T107 will provide the proper voltage correction.
5. Cross-reference the transformer number (T---) to the descriptions in table A. Example: T107 from the above application is 250 VA 120/240 primary and 12/24 secondary.
6. Select the correct connection diagram for your customer. Read down to the bottom of the available line voltage column you've been working with and the wiring diagram is referenced. Example: Connection diagram "A".

FOR BUCKING DOWN AVAILABLE VOLTAGES:

Since buck-boost transformers can be used in reverse, so can the quick-selection tables. Simply use the "available line voltage" column for your desired output voltage and select the proper table by your available line voltage (titled "Output" in the tables).

Table A

kVA	Transformer Number		
	Primary Volts 120/240		Primary Volts 240/480
	Secondary Volts		
	12/24	16/32	24/48
.050	T102	T122	T202
.075	T103	T123	T203
.100	T104	T124	T204
.150	T105	T125	T205
.250	T107	T127	T207
.500	T108	T128	T208
.750	T109	T129	T209
1	T110	T130	T210
1.5	T111	T131	T211
2	T112	T132	T212
5	T037	T040	

SELECTION TABLES

Table 1 – 230 Volts Output, 60 Hertz, Single Phase

Transformer Number	Available Line Voltage							
	203	208	216	219	242	245	253	261
	Load kVA*							
T102	—	.480	—	.960	1.0	—	.530	—
T122	.360	—	.720	—	—	.770	—	.410
T202	—	—	—	1.5	1.8	—	.800	—
T103	—	.720	—	—	—	1.2	—	.620
T123	.540	—	1.1	—	—	—	—	—
T203	—	—	—	—	—	—	—	—
T104	—	.960	—	2.0	2.1	—	1.1	—
T124	.720	—	1.5	—	—	1.6	—	.820
T204	—	—	—	2.9	3.1	—	1.6	—
T105	—	1.5	—	—	—	—	—	—
T125	1.1	—	2.2	—	—	2.3	—	1.3
T205	—	2.4	—	4.8	5.1	—	2.7	—
T107	1.8	—	3.6	—	—	3.9	—	2.1
T127	—	—	—	—	—	—	—	—
T207	—	—	—	—	—	—	—	—
T108	—	4.8	—	9.6	10.1	—	5.3	—
T128	3.6	—	7.2	—	—	7.7	—	4.1
T208	—	7.2	—	14.4	15.2	—	7.9	—
T109	5.4	—	10.8	—	—	11.5	—	6.2
T209	—	—	—	—	—	—	—	—
T110	—	9.6	—	19.2	20.2	—	10.6	—
T130	7.2	—	14.4	—	—	15.4	—	8.2
T210	—	14.4	—	28.8	30.3	—	15.9	—
T111	—	—	—	—	—	—	—	—
T131	10.8	—	21.6	—	—	23.0	—	12.3
T211	—	19.1	—	38.4	40.4	—	21.1	—
T112	14.4	—	28.8	—	—	30.7	—	16.4
T132	—	—	—	—	—	—	—	—
T212	—	—	—	—	—	—	—	—
T113	—	28.7	—	57.5	60.5	—	31.7	—
T133	21.6	—	43.2	—	—	46.0	—	24.5
T213	—	47.8	—	95.9	100.9	—	52.7	—
T037	—	—	72.0	—	—	77.0	—	40.8
T040	36.0	—	—	—	—	—	—	—
Connection ‡ Diagram	A	A	B	B	B	B	A	A

Table 2 – 240 Volts Output, 60 Hertz, Single Phase

Transformer Number	Available Line Voltage							
	208# 212	218	225	229	252	256	264	272
	Load kVA*							
T102	—	.500	—	1.0	1.1	—	.550	—
T122	.380	—	.750	—	—	.800	—	.430
T202	—	.750	—	1.5	1.6	—	.825	—
T103	—	—	—	—	—	1.2	—	.640
T123	.570	—	1.2	—	—	—	—	—
T203	—	—	—	—	—	—	—	—
T104	—	1.0	—	2.0	2.1	—	1.1	—
T124	.750	—	1.5	—	—	1.6	—	.850
T204	—	1.5	—	3.0	3.2	—	1.7	—
T105	—	—	—	—	—	—	—	—
T125	1.2	—	2.3	—	—	2.4	—	1.3
T205	—	2.5	—	5.0	5.3	—	2.8	—
T107	1.9	—	3.8	—	—	4.0	—	2.2
T127	—	—	—	—	—	—	—	—
T207	—	—	—	—	—	—	—	—
T108	—	5.0	—	10.0	10.5	—	5.5	—
T128	3.8	—	7.5	—	—	8.0	—	4.3
T208	—	7.5	—	15.0	15.8	—	8.3	—
T109	5.7	—	11.3	—	—	12.0	—	6.4
T209	—	—	—	—	—	—	—	—
T208	—	—	—	—	—	—	—	—
T110	—	10.0	—	20.0	21.0	—	11.0	—
T130	7.5	—	15.0	—	—	16.0	—	8.5
T210	—	15.0	—	30.0	31.5	—	16.5	—
T111	—	—	—	—	—	—	—	—
T131	11.3	—	22.5	—	—	24.0	—	12.8
T211	—	20.0	—	40.0	42.6	—	22.0	—
T112	15.0	—	30.0	—	—	32.0	—	17.0
T132	—	—	—	—	—	—	—	—
T212	—	—	—	—	—	—	—	—
T113	—	30.0	—	60.0	63.0	—	33.0	—
T133	22.5	—	45.0	—	—	48.0	—	25.5
T213	—	50.0	—	100.0	105.0	—	55.0	—
T037	—	—	75.0	—	—	80.0	—	42.5
T040	37.5	—	—	—	—	—	—	—
Connection ‡ Diagram	A	A	B	B	B	B	A	A

Table 3 – 115 Volts Output, 60 Hertz, Single Phase

Transformer Number	Available Line Voltage							
	91	96	101	105	127	130	138	146
	Load kVA*							
T102	—	.240	—	.480	.539	—	.290	—
T122	.180	—	.360	—	—	.410	—	.230
T103	—	.360	—	.720	.800	—	.440	—
T123	.270	—	.540	—	—	.610	—	.350
T104	—	.480	—	.960	1.1	—	.580	—
T124	.360	—	.720	—	—	.820	—	.460
T105	—	.720	—	1.5	1.6	—	.870	—
T125	.540	—	1.1	—	—	1.3	—	.690
T107	—	1.2	—	2.4	2.7	—	1.5	—
T127	.900	—	1.8	—	—	2.1	—	1.2
T108	—	2.4	—	4.8	5.3	—	2.9	—
T128	1.8	—	3.6	—	—	4.1	—	2.3
T109	—	3.6	—	7.2	8.0	—	4.4	—
T129	2.7	—	5.4	—	—	6.1	—	3.5
T110	—	4.8	—	9.6	10.6	—	5.8	—
T130	3.6	—	7.2	—	—	8.2	—	4.6
T111	—	7.2	—	14.4	15.9	—	8.6	—
T131	5.4	—	10.8	—	—	12.2	—	6.9
T112	—	9.6	—	19.2	21.2	—	11.5	—
T132	7.2	—	14.4	—	—	16.3	—	9.2
T113	—	14.4	—	28.8	31.8	—	17.3	—
T133	10.8	—	21.6	—	—	24.4	—	13.7
T037	—	24.0	—	48.0	53.0	—	28.8	—
T040	18.0	—	36.0	—	—	41.0	—	22.9
Connection ‡ Diagram	C	C	D	D	D	D	C	C

Table 4 – 120 Volts Output, 60 Hertz, Single Phase

Transformer Number	Available Line Voltage							
	95	100	108	109	132	136	144	152
	Load kVA*							
T102	—	.250	—	.500	.550	—	.300	—
T122	.190	—	.360	—	—	.430	—	.240
T103	—	.380	—	.750	.830	—	.450	—
T123	.290	—	.570	—	—	.640	—	.350
T104	—	.500	—	1.0	1.1	—	.600	—
T124	.380	—	.750	—	—	.850	—	.460
T105	—	.750	—	1.5	1.7	—	.900	—
T125	.570	—	1.2	—	—	1.3	—	.720
T107	—	1.3	—	2.5	2.8	—	1.5	—
T127	.940	—	1.9	—	—	2.2	—	1.2
T108	—	2.5	—	5.0	5.5	—	3.0	—
T128	1.9	—	3.8	—	—	4.3	—	2.4
T109	—	3.8	—	7.5	8.3	—	4.5	—
T129	2.9	—	5.7	—	—	6.4	—	3.6
T110	—	5.0	—	10.0	11.0	—	6.0	—
T130	3.8	—	7.5	—	—	8.5	—	4.8
T111	—	7.5	—	15.0	16.5	—	9.0	—
T131	5.7	—	11.3	—	—	12.8	—	7.2
T112	—	10.0	—	20.0	22.0	—	12.0	—
T132	7.5	—	15.0	—	—	17.0	—	9.5
T113	—	15.0	—	30.0	33.0	—	18.0	—
T133	11.3	—	22.5	—	—	25.5	—	14.3
T037	—	25.0	—	50.0	55.0	—	30.0	—
T040	18.8	—	38.0	—	—	43.0	—	23.8
Connection ‡ Diagram	C	C	D	D	D	D	C	C

* Load kVA is the maximum load at voltages shown when transformers are connected as autotransformers, according to the diagram referenced and shown on back page.

When 208 is the available line voltage, use the 212 voltage column. This will result in output voltage of 236 volts, which should be sufficient for most applications.

‡ Warning — 3 phase autotransformers should never be used to obtain 4 wire output with 3 wire input.

FAQ #12

FREQUENTLY ASKED QUESTIONS

Table 5 – 230 Volts 3 Wire Output, 60 Hertz Single Phase

Quantity Required Per Bank	Transformer Number	Available Line Voltage			
		181Y/105	192Y/111	203Y/117	208Y/120
		Load kVA*			
3	T102	—	.830	—	1.7
3	T122	.620	—	1.3	—
3	T202	—	—	—	—
3	T103	930	1.2	—	2.5
3	T123	—	—	1.9	—
3	T203	—	—	—	—
3	T104	—	1.7	—	3.4
3	T124	1.2	—	2.5	—
3	T204	—	—	—	—
3	T105	—	2.5	—	5.0
3	T125	1.9	—	3.7	—
3	T205	—	—	—	—
3	T107	—	4.2	—	8.3
3	T127	3.1	—	6.2	—
3	T207	—	—	—	—
3	T108	—	8.3	—	16.6
3	T128	6.2	—	12.5	—
3	T208	—	—	—	—
3	T109	—	12.5	—	25.0
3	T129	9.3	—	18.7	—
3	T209	—	—	—	—
3	T110	—	16.6	—	33.2
3	T130	12.5	—	25.0	—
3	T210	—	—	—	—
3	T111	—	25.0	—	50.0
3	T131	18.7	—	37.5	—
3	T211	—	—	—	—
3	T112	—	33.0	—	66.0
3	T132	25.0	—	50.0	—
3	T212	—	—	—	—
3	T113	—	50.0	—	100.0
3	T133	37.5	—	75.0	—
3	T213	—	—	—	—
3	T037	—	83.0	—	167.0
3	T040	62.0	—	125.0	—
	Connection ‡ Diagram	F	F	G	G

Table 6 – 240 Volts 3 Wire Output, 60 Hertz Three Phase

Quantity Required Per Bank	Transformer Number	Available Line Voltage			
		189Y/109	200Y/115	208Y/120# 212Y/122	218Y/126
		Load kVA*			
3	T102	—	.870	—	1.7
3	T122	650	—	1.3	—
3	T202	—	—	—	—
3	T103	970	1.3	—	2.6
3	T123	—	—	2.0	—
3	T203	—	—	—	—
3	T104	—	1.7	—	3.5
3	T124	1.3	—	2.6	—
3	T204	—	—	—	—
3	T105	—	2.6	—	5.2
3	T125	2.0	—	3.9	—
3	T205	—	—	—	—
3	T107	—	4.3	—	8.7
3	T127	3.2	—	6.5	—
3	T207	—	—	—	—
3	T108	—	8.7	—	17.3
3	T128	6.5	—	13.0	—
3	T208	—	—	—	—
3	T109	—	13.0	—	26.0
3	T129	9.7	—	19.5	—
3	T209	—	—	—	—
3	T110	—	17.3	—	34.6
3	T130	13.0	—	26.0	—
3	T210	—	—	—	—
3	T111	—	26.0	—	52.0
3	T131	19.5	—	39.0	—
3	T211	—	—	—	—
3	T112	—	35.0	—	70.0
3	T132	26.0	—	52.0	—
3	T212	—	—	—	—
3	T113	—	52.0	—	104.0
3	T133	39.0	—	78.0	—
3	T213	—	—	—	—
3	T037	—	87.0	—	173.0
3	T040	65.0	—	130.0	—
	Connection ‡ Diagram	F	F	G	G

Table 7 – 460 Volts, 3 Wire Output, 60 Hertz Three Phase

Quantity Required Per Bank	Transformer Number	Available Line Voltage — 3 or 4 Wire			
		406	418	432	436
		Three Phase Load kVA*			
3	T102	—	.166	—	3.32
3	T122	1.25	—	2.49	—
3	T202	—	—	—	—
3	T103	—	2.48	—	4.96
3	T123	1.87	—	3.73	—
3	T203	—	—	—	—
3	T104	—	3.31	—	6.62
3	T124	2.49	—	4.97	—
3	T204	—	—	—	—
3	T105	—	4.97	—	9.94
3	T125	3.73	—	7.46	—
3	T205	—	—	—	—
3	T107	—	8.28	—	16.6
3	T127	6.22	—	12.4	—
3	T207	—	—	—	—
3	T108	—	16.6	—	33.2
3	T128	12.5	—	24.9	—
3	T208	—	—	—	—
3	T109	—	24.8	—	59.6
3	T129	18.7	—	37.3	—
3	T209	—	—	—	—
3	T110	—	33.1	—	66.2
3	T130	24.9	—	49.7	—
3	T210	—	—	—	—
3	T111	—	49.7	—	99.4
3	T131	37.3	—	74.6	—
3	T211	—	—	—	—
3	T112	—	66.3	—	133.0
3	T132	49.7	—	99.5	—
3	T212	—	—	—	—
3	T113	—	99.2	—	198.8
3	T133	74.8	—	149.0	—
3	T213	—	—	—	—
3	T037	—	166.0	—	332.8
3	T040	126.0	—	249.0	—
	Connection ‡ Diagram	H	H	I	I

Table 8 – 460 Volts, 3 Wire Output, 60 Hertz Three Phase

Quantity Required Per Bank	Transformer Number	Available Line Voltage — 3 or 4 Wire		
		424	436	450
		Three Phase Load kVA*		
3	T102	—	.174	—
3	T122	1.3	—	2.6
3	T202	—	—	—
3	T103	—	2.6	—
3	T123	1.95	—	3.9
3	T203	—	—	—
3	T104	—	3.5	—
3	T124	2.6	—	5.2
3	T204	—	—	—
3	T105	—	5.2	—
3	T125	3.9	—	7.8
3	T205	—	—	—
3	T107	—	8.7	—
3	T127	6.5	—	13.0
3	T207	—	—	—
3	T108	—	17.4	—
3	T128	13.0	—	26.0
3	T208	—	—	—
3	T109	—	26.0	—
3	T129	19.5	—	39.0
3	T209	—	—	—
3	T110	—	35.0	—
3	T130	26.0	—	52.0
3	T210	—	—	—
3	T111	—	52.0	—
3	T131	39.0	—	78.0
3	T211	—	—	—
3	T112	—	69.0	—
3	T132	52.0	—	104.0
3	T212	—	—	—
3	T113	—	104.0	—
3	T133	78.0	—	156.0
3	T213	—	—	—
3	T037	—	174.0	—
3	T040	130.0	—	260.0
	Connection ‡ Diagram	H	H	I

Table 9 – 480 Volts, 3 Wire Output, 60 Hertz Three Phase

Quantity Required Per Bank	Transformer Number	Available Line Voltage	
		600	575
		Three Phase Load kVA*	
2	T088	4.3	—
2	T089	—	4.1
2	T009	6.5	—
2	T089	—	6.2
2	T010	8.6	—
2	T090	—	8.3
2	T011	13.0	—
2	T091	—	12.4
2	T012	17.2	—
2	T092	—	16.5
2	T013	25.8	—
2	T093	—	24.8
	Connection ‡ Diagram	J	K

Table 10 – 480 Volts Output, 60 Hertz Single Phase

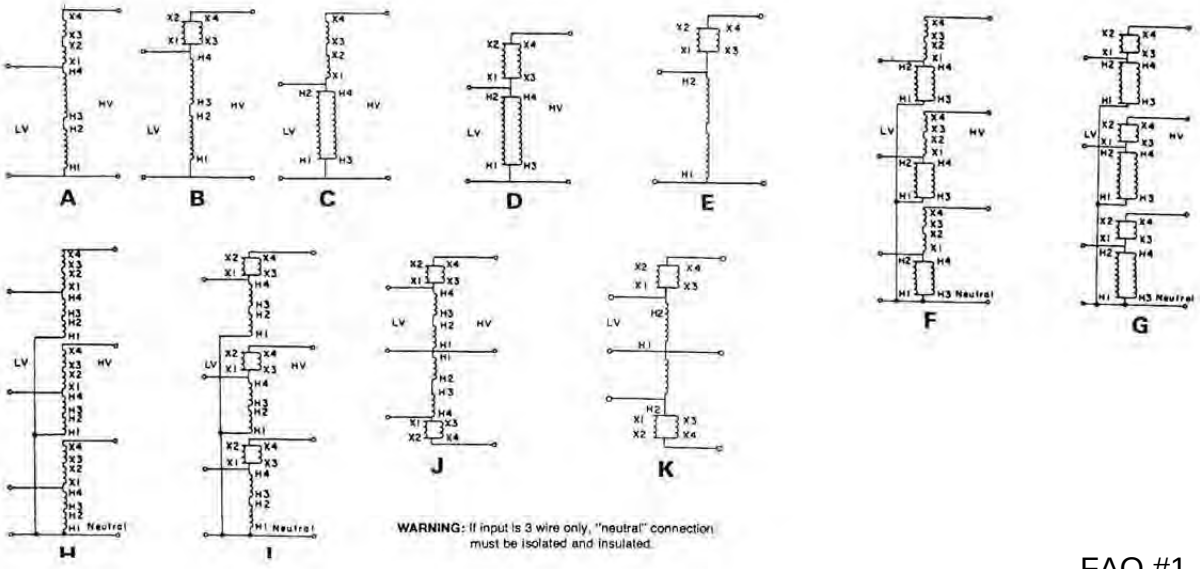
Transformer Number	Available Line Voltage	
	600	575
	Three Phase Load kVA*	
T008	2.5	—
T088	—	2.4
T009	3.7	—
T089	—	3.6
T010	5.0	—
T090	—	4.8
T011	7.5	—
T091	—	7.2
T012	10.0	—
T092	—	9.6
T013	15.0	—
T093	—	14.3
Connection ‡ Diagram	B	E

When 208Y/120 volts is the available line voltage, the 212Y/122 column may be used to obtain 236 volts which should be satisfactory for most applications.

* The load kVA in tables 7, 8, 9 and 10 is the maximum load at voltages shown when transformers are connected as autotransformers according to the diagram referenced and shown on back page.

‡ Warning — 3 phase autotransformers should never be used to obtain 4 wire output with 3 wire input.

CONNECTION DIAGRAMS



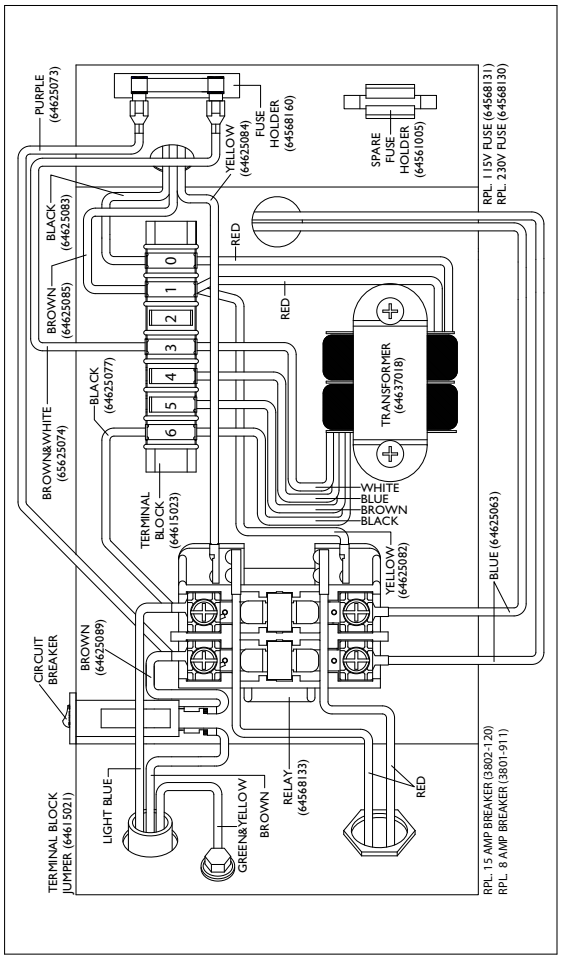
WARNING: If input is 3 wire only, "neutral" connection must be isolated and insulated.

FREQUENTLY ASKED QUESTIONS

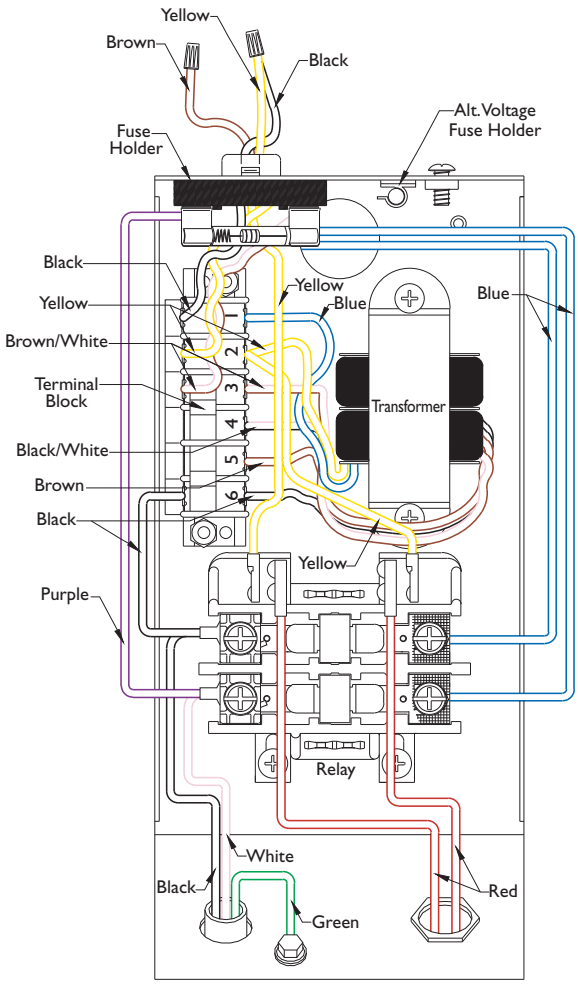
FAQ #1

How is a new transformer wired in an old relay box?
(V Series)

New Transformer



Old Relay Box

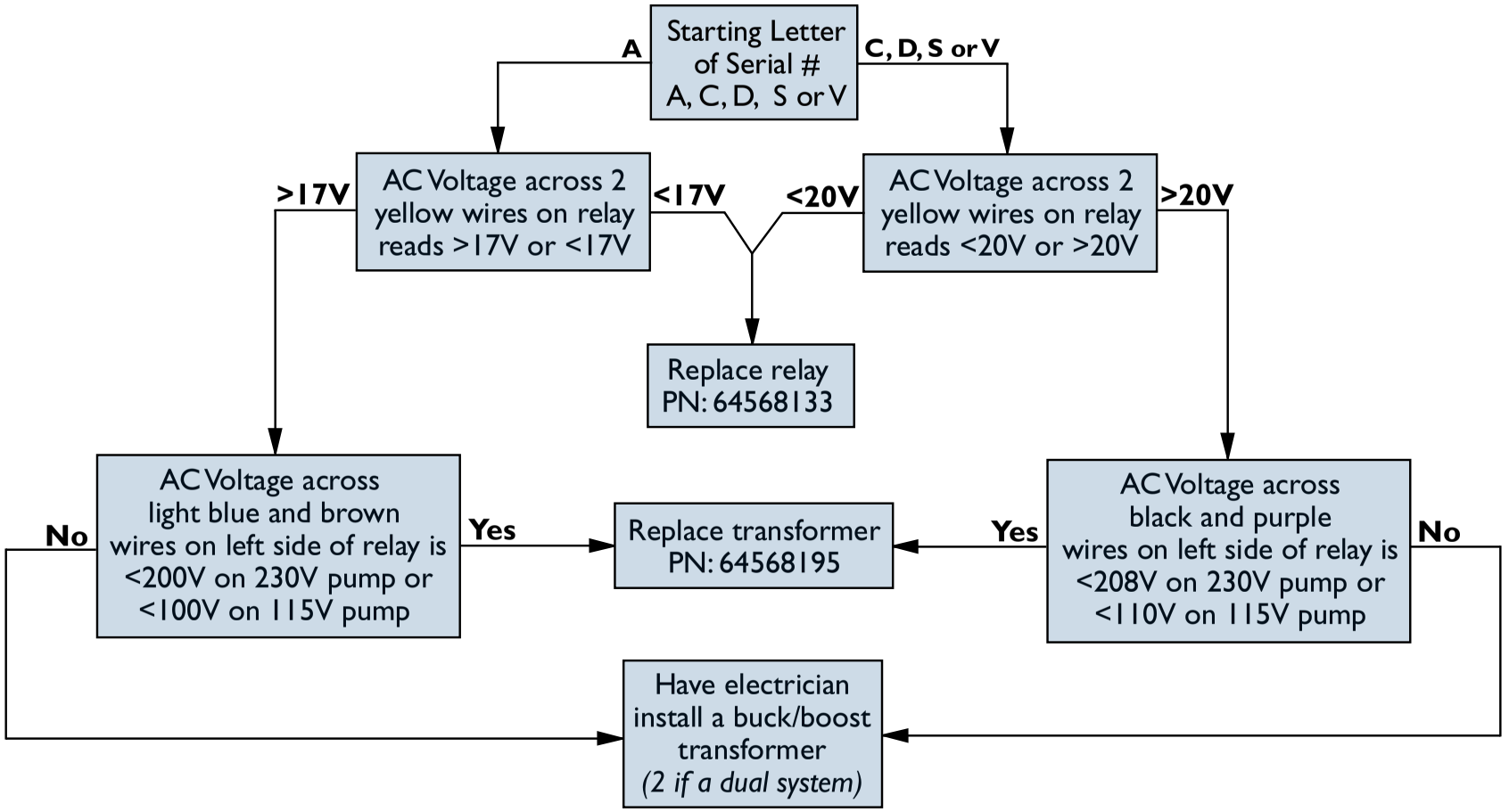


CustomAir

FAQ #13

FREQUENTLY ASKED QUESTIONS

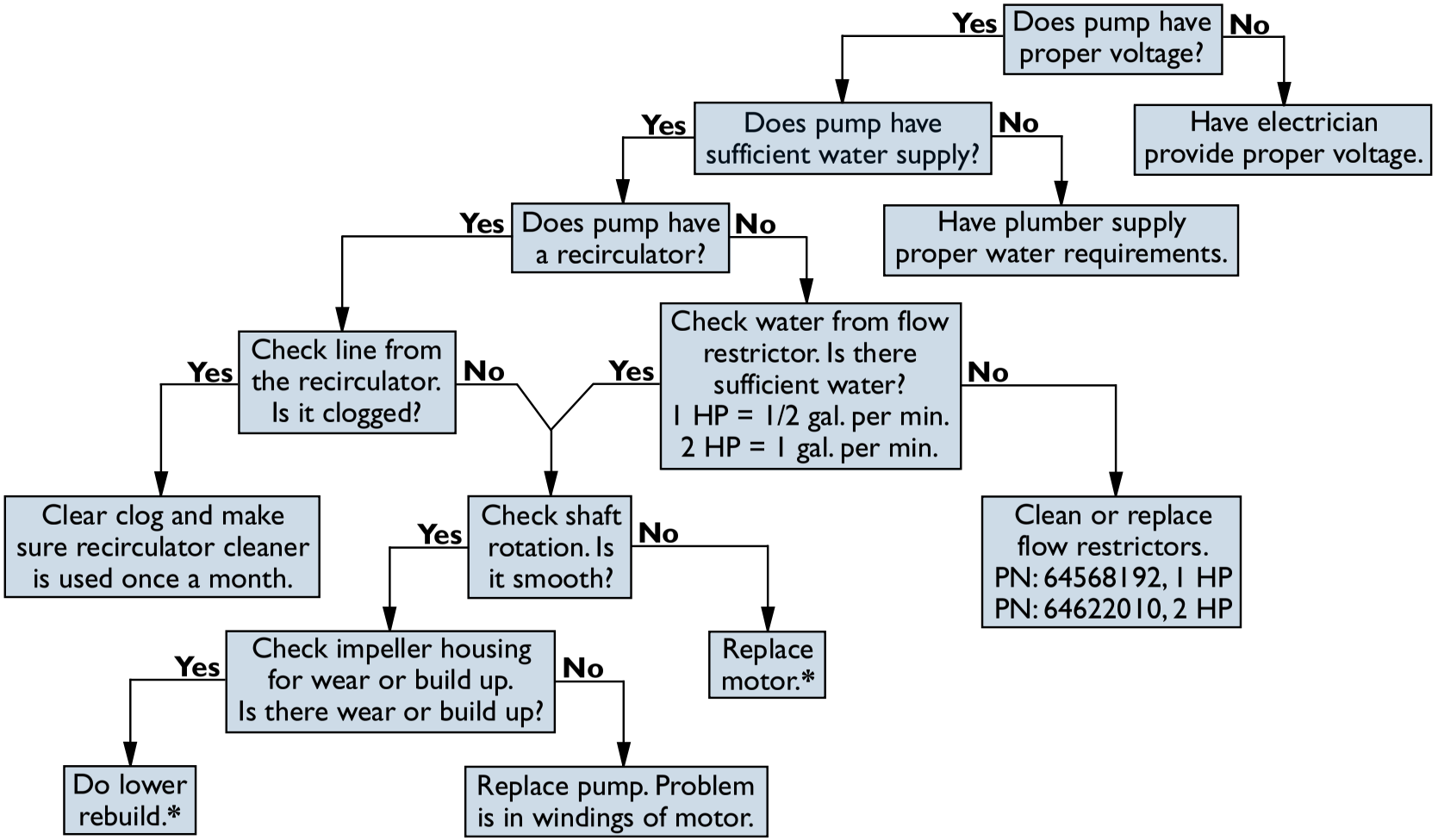
Why won't the vacuum relay engage and the pump doesn't turn on?



CustomAir

FAQ #23

Why does the vacuum pump shut down, cool then restart?

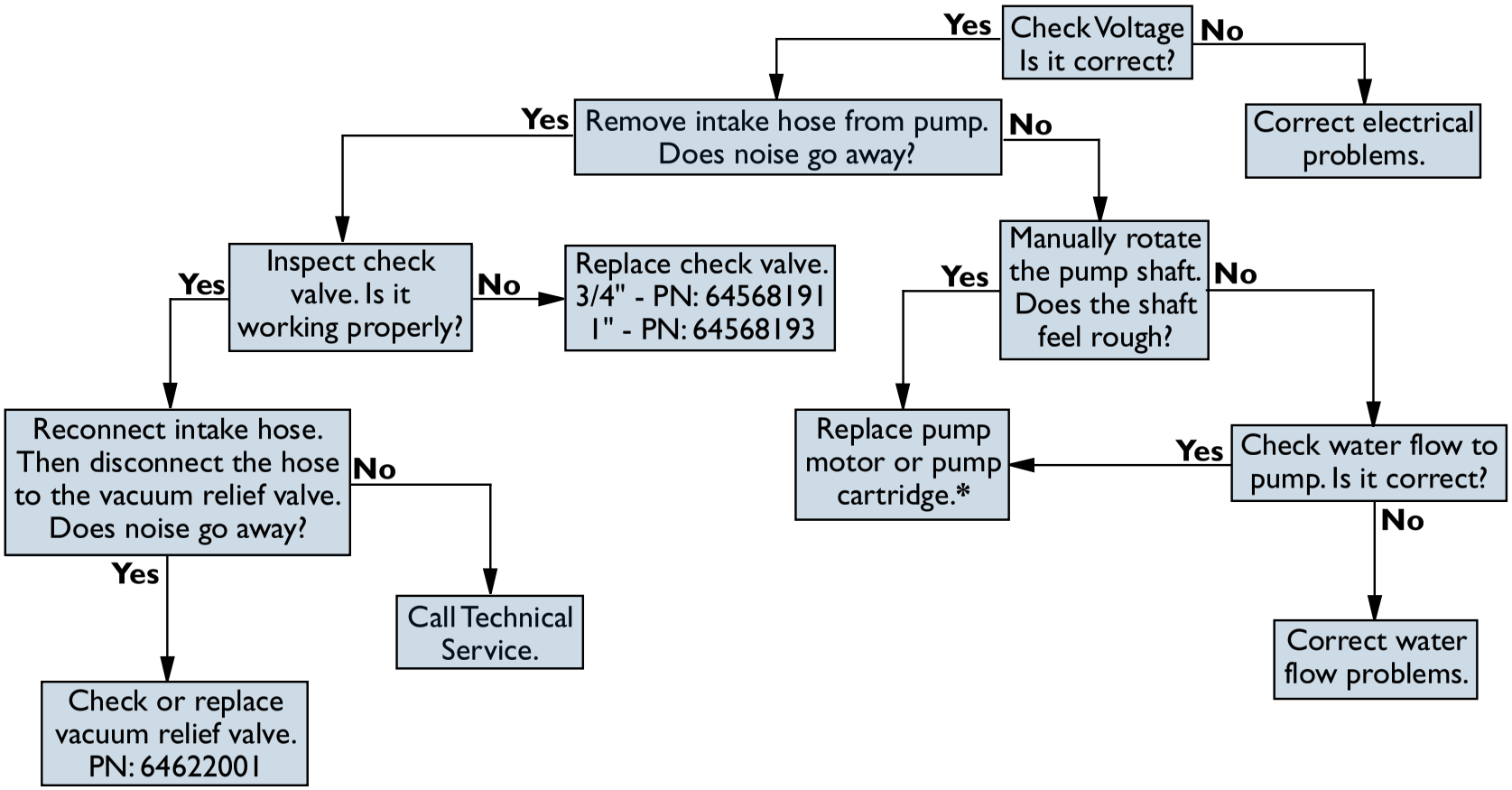


* *For part # information contact Tech Service at 1-866-DTE-INFO.*

CustomAir

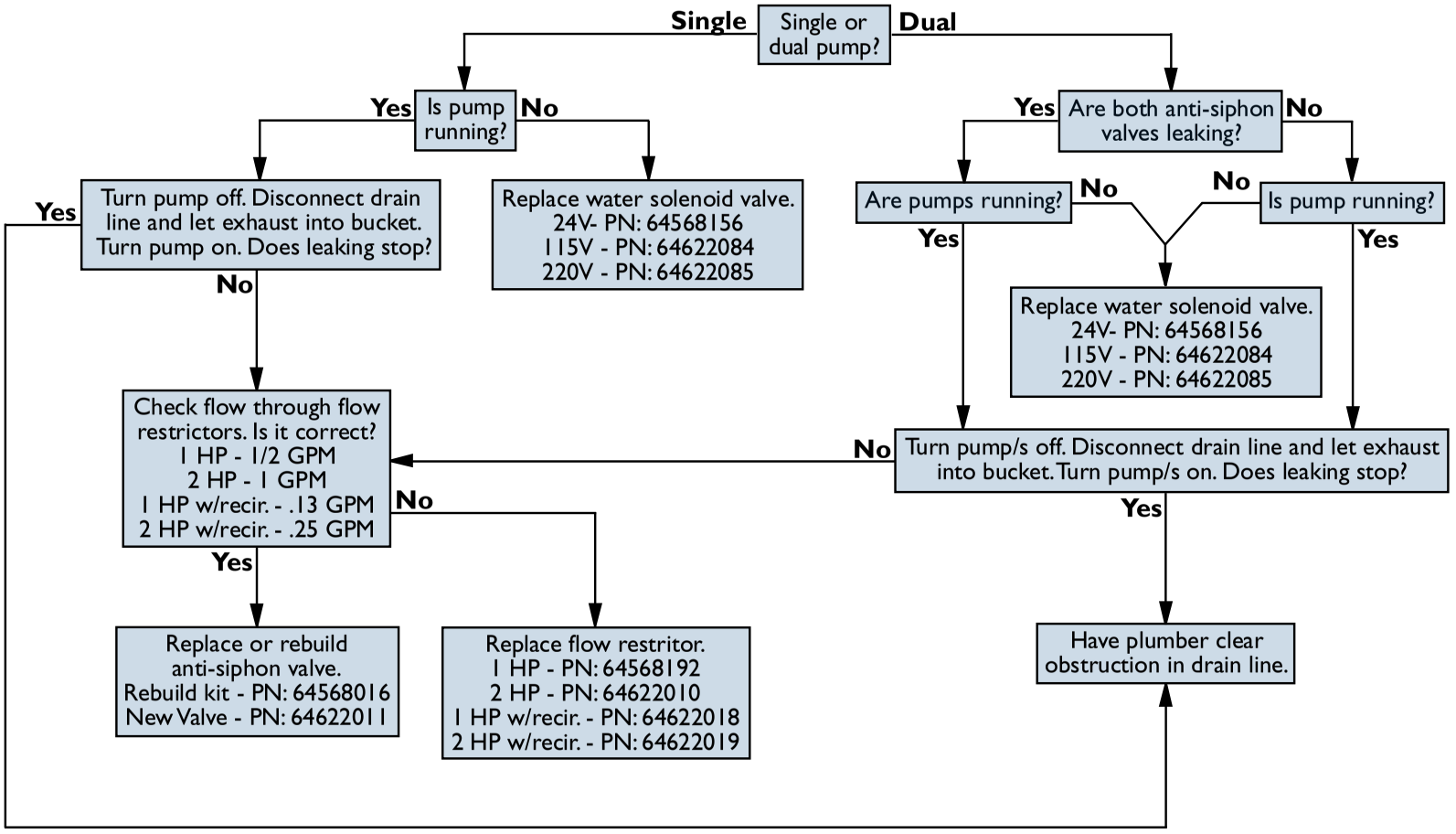
FAQ #29

Why does pump make squealing/whistling sound?

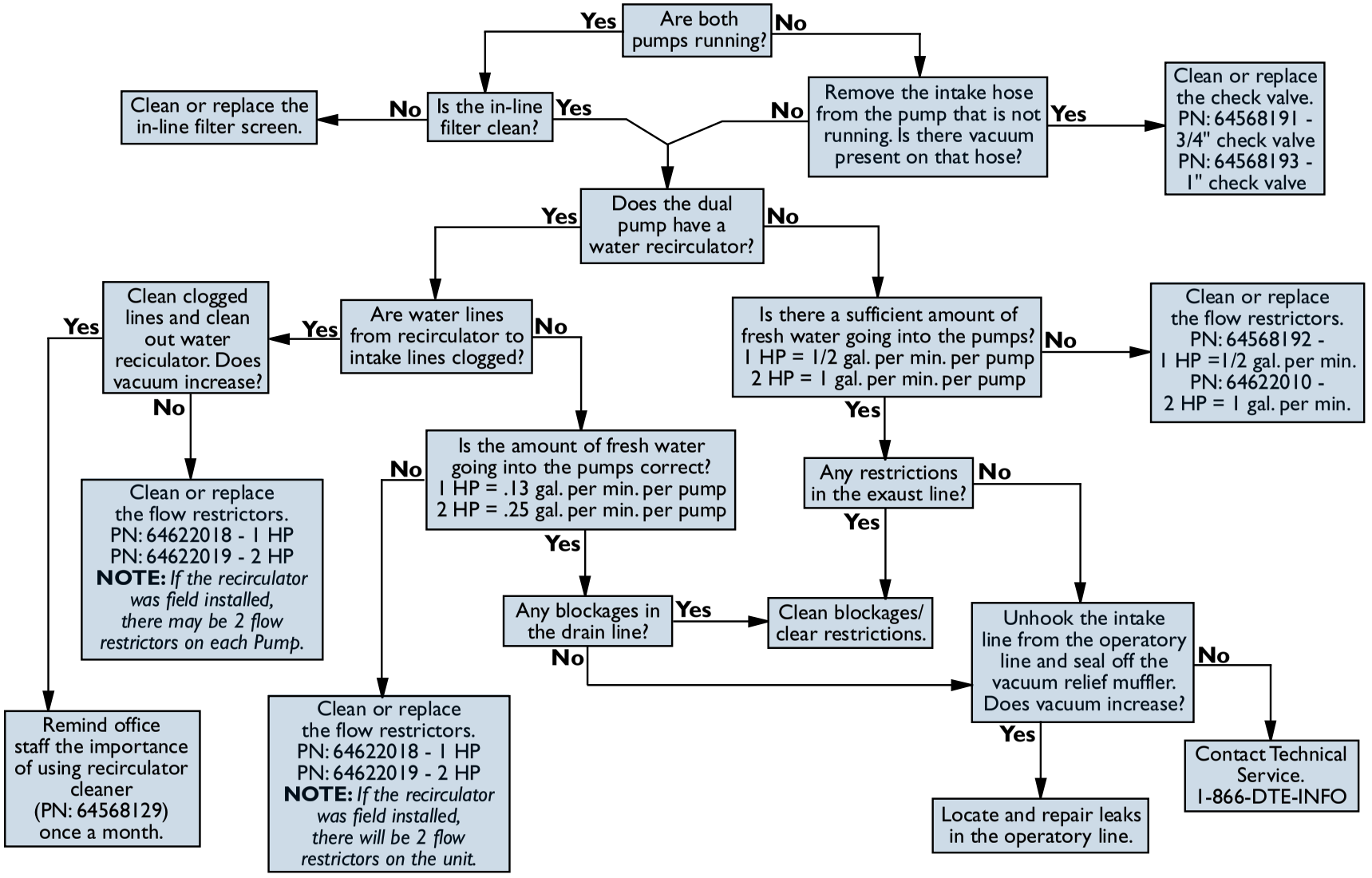


* *Contact Tech Service at 1-866-DTE-INFO.*

Why does water leak from the anti-siphon valve?



Why is vacuum from dual pump weak?



CustomAir

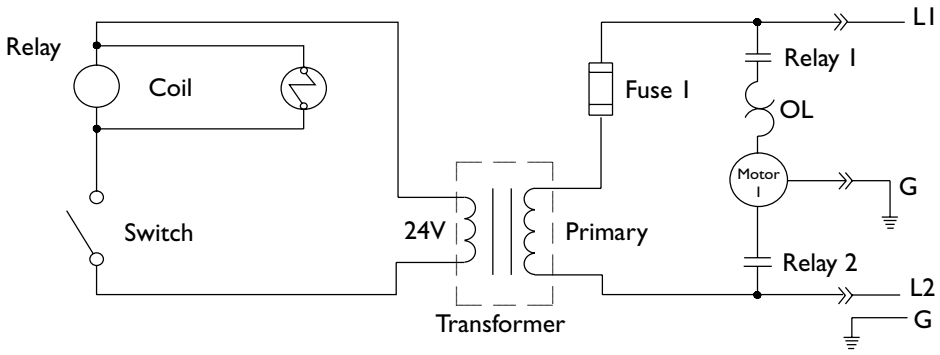
FAQ #43

Vacuum Pump		
Symptom	**Possible Cause(s)**	**Solution**
Pump will not run	Check all wires for loose or broken connections. Check fuse. Check low voltage leads *(yellow and black wires)* for 24 volts.	If voltage is not present, replace the transformer or fuse. *(Also see Electrical Problems Chart.)* *(On Page 29)*
	Turn power on and off watching to see if relay breaker bar operates properly.	If relay not operating properly, and assuming all other parts are good, replace the relay. *(Also see Electrical Problems Chart.)* *(On Page 29)*
	Test solenoid valve by loosening brass nut on right side. If water flows out with power on, turn power off. Water flow should stop. **Caution: Do not** operate the pump for an extended time, because running the pump without water could cause internal damage.	If water flow does not stop with power off, replace the solenoid valve.
Motor stops or will not start	Circuit breaker, main cut-off and low-voltage operatory switches are in the **OFF** position.	Place switches in **ON** position.
	Unit is not plugged in.	Plug in unit.
	Loose or broken wires.	Tighten, repair or replace wires.
	Motor hums indicating a bad capacitor.	Replace capacitor.
	Tight or noisy motor.	Check bearings. Make sure pump is properly shimmed to the motor. Or, remove any debris in the pump.
	Motor is overheating.	Make sure the vacuum relief valve is adjusted properly and the motor has sufficient ventilation and water supply. Check for low line voltage.

Vacuum Pump (Continued)		
Symptom	**Possible Cause(s)**	**Solution**
Low or no vacuum	Dirty filter	Clean operatory and secondary filters if necessary.
	Water control assembly clogged not allowing water to go through pump.	Turn pump **OFF** immediately to prevent internal damage. Then unclog water control assembly.
	Loose or broken vacuum line connections.	Tighten, repair or replace vacuum line connections.
	Swing check valves clogged allowing pump to suction through the other pump.	Take off the top of the valve and, if possible, remove debris. Otherwise, the valve should be replaced.
	Pump is worn out.	Refer to pump repair section.
	Insufficient water supply.	Check supply where it connects to the cabinet. Then, check the water control valve. The water control solenoid valve opens when the pump is turned on. Check this function by disconnecting the water line that enters the vacuum housing and by holding a container under the valve. Then, turn on the pump. There should be a steady stream of water. **CAUTION: DO NOT** LEAVE THE PUMP RUNNING WITHOUT WATER! If there is no water flow, replace the water control solenoid valve.

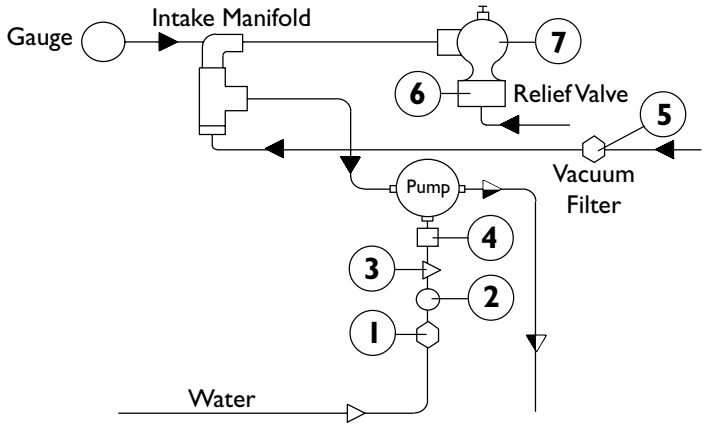
Electrical System		
Symptom	**Possible Cause(s)**	**Solution**
Pump not running because of suspect electrical problem	Main power supply has blown fuse or circuit breaker.	Replace blown fuse or reset circuit breaker.
	Power not reaching pump or incorrect voltage.	Check connection box on the side of the dual cabinet to verify power is reaching the pump and main power supply is the correct voltage.
	Blown fuse in the control box.	Replace the fuse with the same rated capacity as the one from the factory.
	Loose connections inside the control box.	Remove the control box cover and visually inspect for loose connections. *(Refer to the schematic inside the control box cover for the components and wiring scheme for that particular box.)*
Motor does not start by switch	Defective transformer or coil in the relay.	Using a non-conductive device, push in the tabs on the relay to determine if the motor will start. Then using electrical test equipment, verify the voltage coming out of the secondary side of the transformer. If it is less than 21V, replace the transformer. If it is more than 21V, replace the relay.

Wiring Schematic



The Dual Wet Vacuum electrical control system is a low-voltage (24V) circuit. This system also provides automatic control of the water supply system. The wiring schematic shows for electrical rough-in.

Air/Water Flow Circulation Diagram

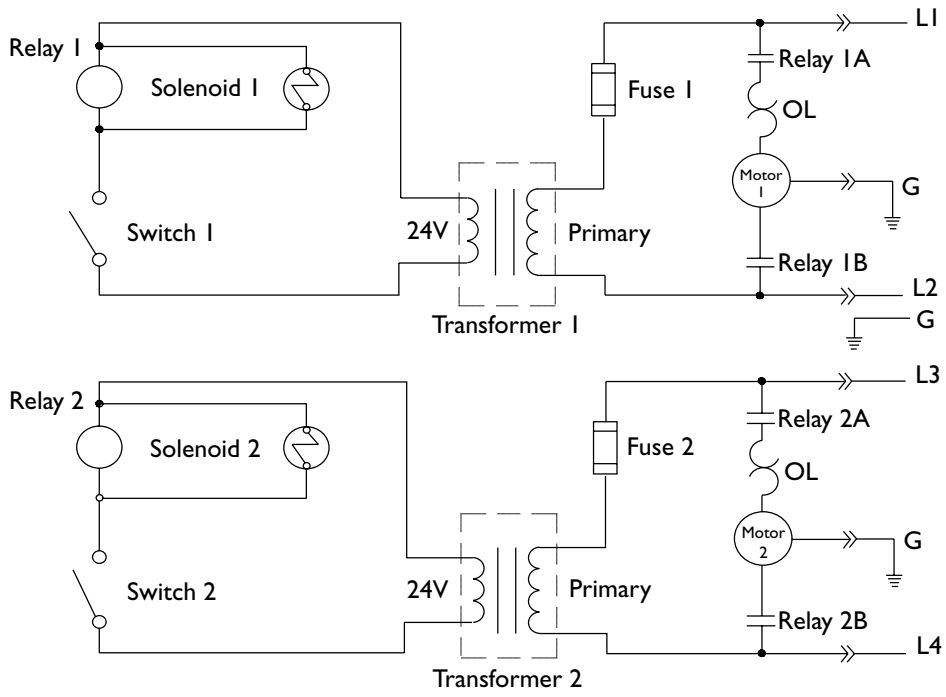


The circulation diagram shows the relationship of all the major assemblies to the total system. All connecting lines are marked with a symbol to indicate their function: vacuum line, water line or waste line. The assemblies are individually broken down and further explained in other sections of this manual.

No.	Qty.	Part No.	Description
1	2	64568135	Filter, Water
2	2	64568156	Valve, Solenoid (Only)
3	2	64622011	Valve, Anti-Siphon
4A	2	64568192	Valve, Flow Regulator--1 HP
4B	2	64622010	Valve, Flow Regulator--2 HP

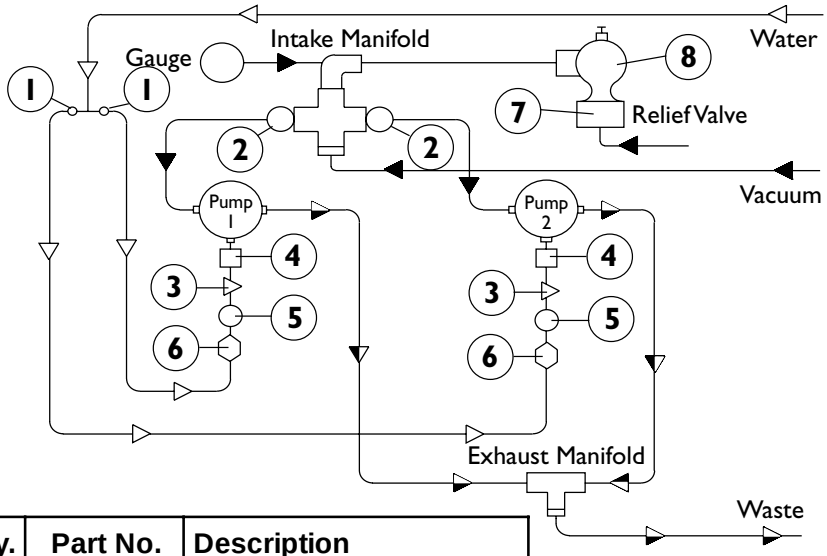
No.	Qty.	Part No.	Description
5	1	64545040	Filter, Vacuum
6	1	64568159	Muffler, Vacuum Relief
7	1	64622001	Valve, Vacuum Relief

Wiring Schematic



The Dual Wet Vacuum electrical control system is a low-voltage (24V) circuit, designed to provide two totally independent control systems for each pump unit. This system also provides automatic control of the water supply system for each pump. The wiring schematic shows for electrical rough-in.

Air/Water Flow Circulation Diagram



The circulation diagram shows the relationship of all the major assemblies to the total system. All connecting lines are marked with a symbol to indicate their function: vacuum line, water line or waste line. The assemblies are individually broken down and further explained in other sections of this manual.

No.	Qty.	Part No.	Description
1	2	64622012	Valve, Water Shutoff
2	2	64568191	Valve, Swing Check
3	2	64622011A	Valve, Anti-Siphon
4A	2	64568192	Valve, Flow Regulator--1 HP
4B	2	64622010	Valve, Flow Regulator--2 HP

No.	Qty.	Part No.	Description
5	2	64568156	Valve, Solenoid (Only)
6	2	64568135	Filter, Water
7	1	64568159	Muffler, Vacuum Relief
8	1	64622001	Valve, Vacuum Relief

Remote Low-Voltage Switch Control

— NOTICE —

All wiring between the main control box and equipment should be **Class B, low-voltage**. *In most cases, a conduit is* ***not*** *required when using this type of wiring.*

— WARNING —

Before proceeding with any electrical installation, comply with and maintain all applicable local electrical code(s) and regulations.

IMPORTANT NOTE: *If not using a DentalEZ Master Control Panel Kit, proceed as follows:*

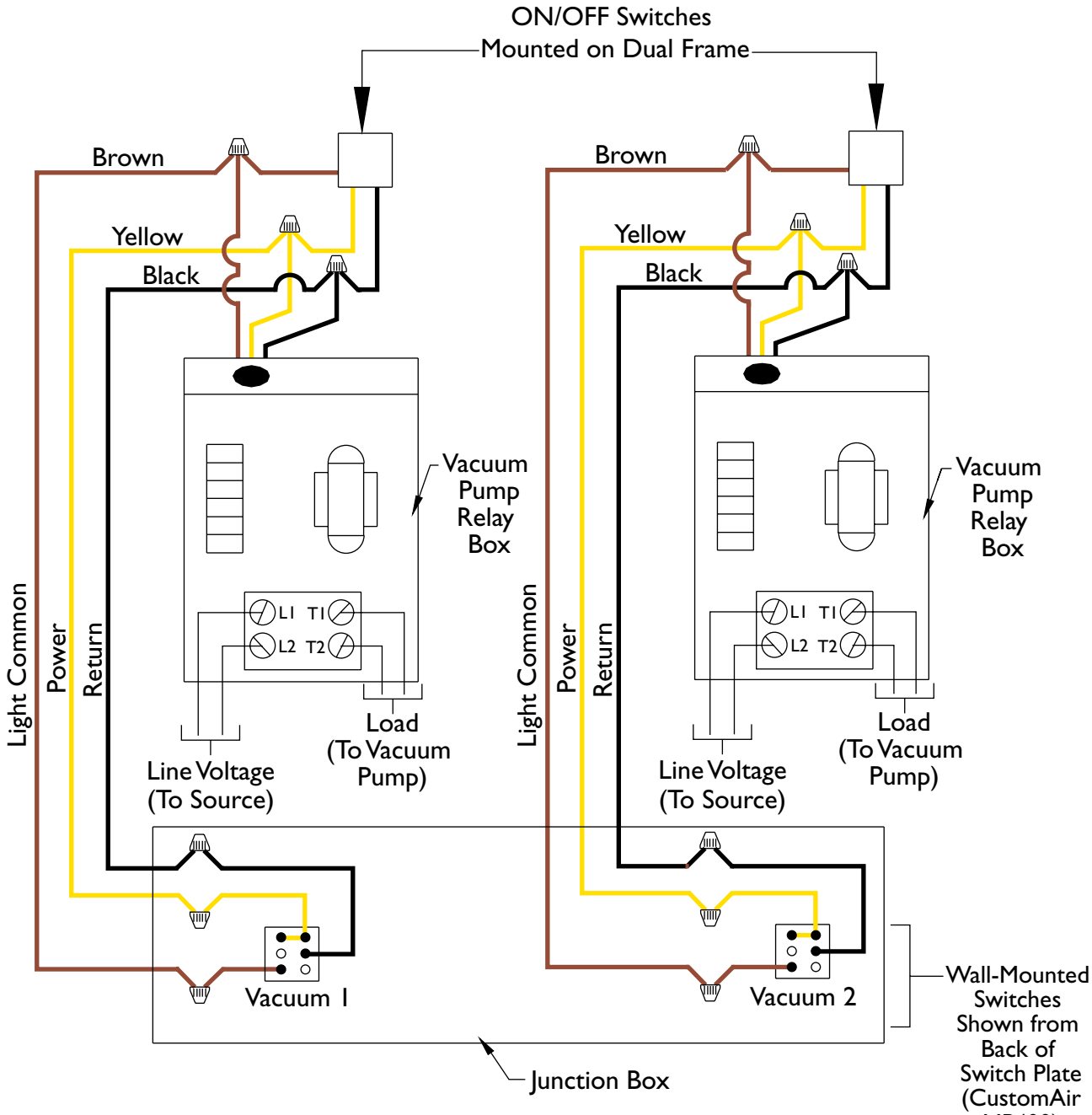
1. Position the master switch in the desired location.
2. Run the appropriate wires to their respective euipment location. *(See wiring chart below.)*
3. Connect wires according to the wiring diagrams on the next two pages.

WIRING CHART

Model No.	No. of Wires	Wire Under 150 ft.	Wire Over 150 ft.
CV-101	3	18 AWG	16 AWG
CV-102	3	18 AWG	16 AWG
DV-301	3	18 AWG	16 AWG
DV-302	3	18 AWG	16 AWG
MC-201	6	18 AWG	16 AWG
MC-202	6	18 AWG	16 AWG
Air Compressor	3	18 AWG	16 AWG
MWCV Solenoid Valve	2	18 AWG	16 AWG
MWCV Transformer	2	18 AWG	16 AWG

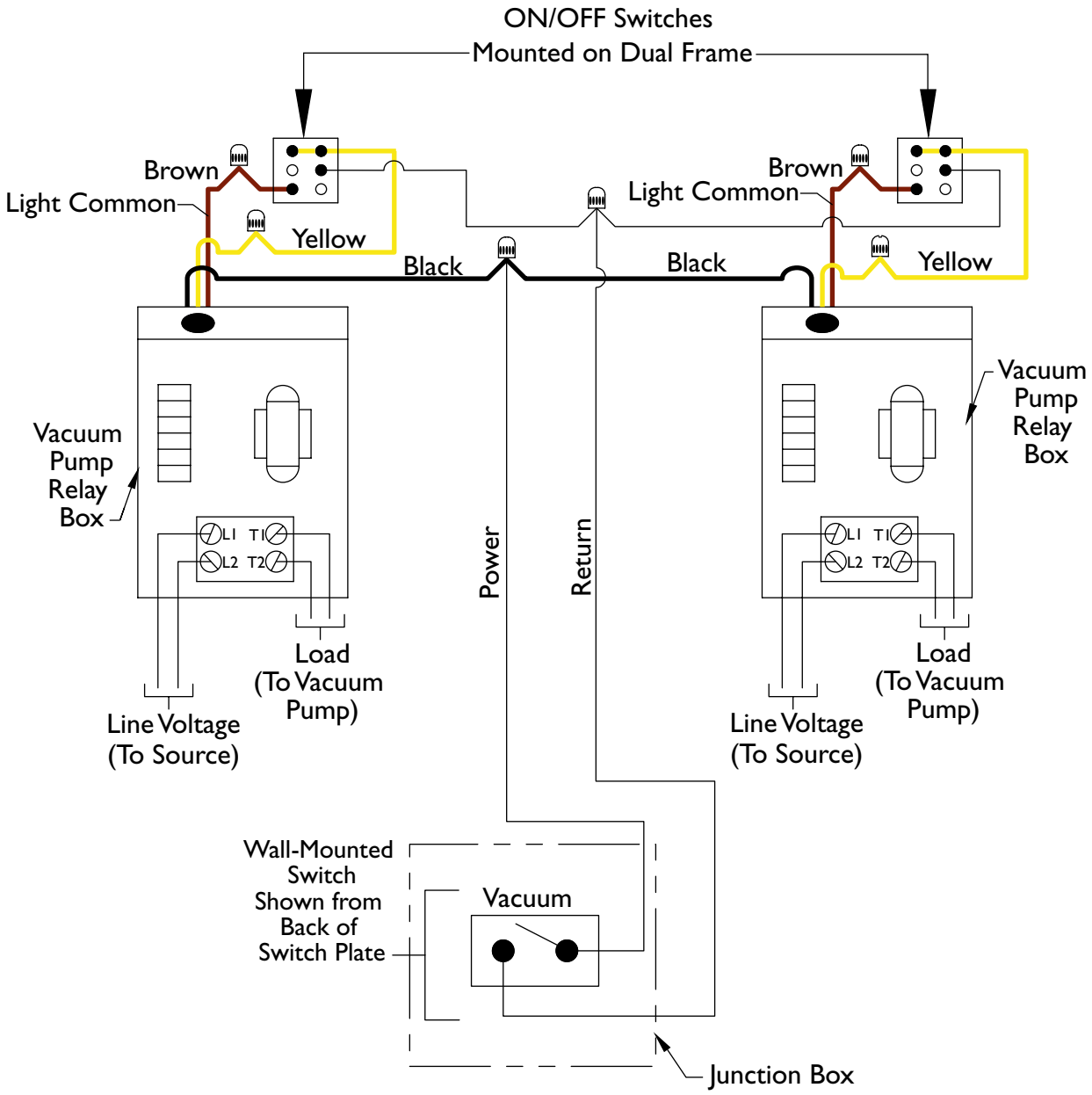
Two Switch, Dual Vacuum System

IMPORTANT NOTE: *Refer to wiring chart on Page 32 for length and gauge of wire.*



One Switch, Dual Vacuum System

IMPORTANT NOTE: *Refer to wiring chart on Page 32 for length and gauge of wire.*



Vacuum Pump System Repair Procedure

If the motor does not start after checking through the troubleshooting charts, the motor may be defective. If the pump must be removed for factory repair or replacement, perform the following vacuum pump system repair procedure:

Tools Required:

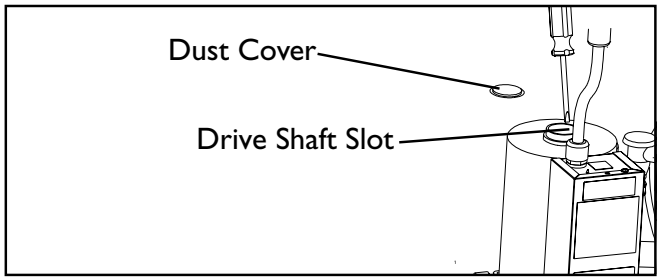
- Wire Stripper/Crimper
- 1/4", 5/16", 11/32" and 3/8" Nut Driver
- 7/16", 1/2", 9/16" and 15/16" Open-end Wrench
- 1-3/4" Socket and Torque Wrench
- 15/16" Socket with Ratchet
- Hammer
- Flat-blade Screwdriver
- Wire Cutter
- Needle-nose Pliers
- Channel-lock Pliers
- Paint Scraper
- Pump Motor Holding Fixture: DTE# 64546001
- Pop Riveter
- Bench Vise
- Bearing Seal Lubricant
- Red Loctite/Pipe Sealant: Item# 57141

— WARNING —
Do not attempt these repairs in the dental office.

Test Procedure — Diagnostic

Determine if the required repair procedure is electrical or mechanical.

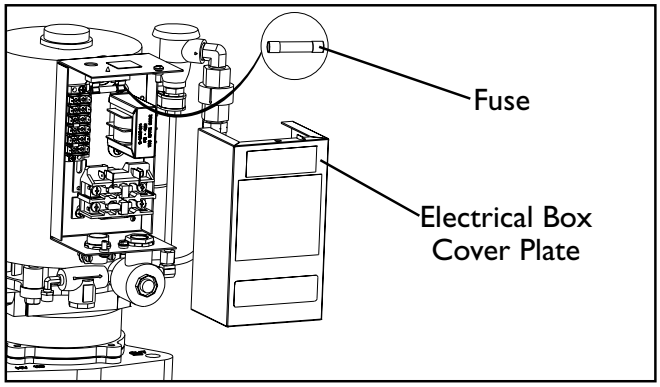
1. Unplug the electrical supply cord.
2. Using the manual valve, turn **OFF** the water supply.
3. Remove the dust cover located at the top center of the motor.



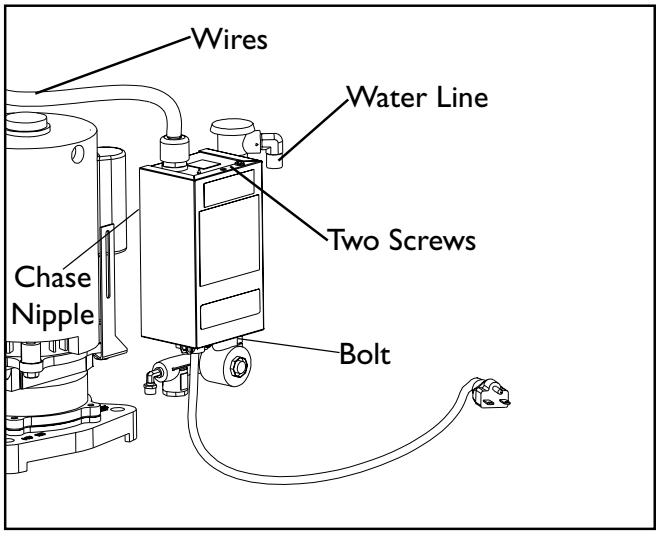
4. Using a flat-blade screwdriver, engage the slot in the drive shaft and rotate the shaft to check for free movement:
   - If the shaft moves smoothly, proceed to **Electrical Box Removal**.
   - If the shaft is difficult to turn or is jammed, proceed to **Pump Removal/Disassembly**.

Electrical Box Removal

1. Remove the electrical box cover plate.



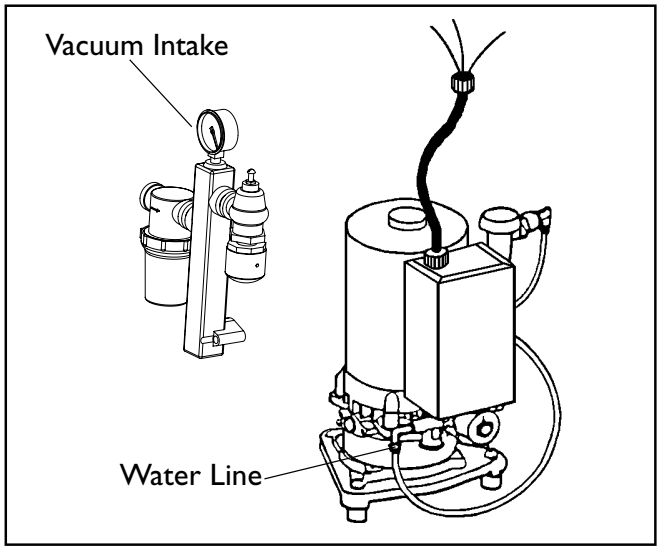
2. Check the wire leads to the motor for breaks or bad connections.
3. Check the fuse and check for loose or broken wires in the electrical box.
4. Disconnect the wires from the top of the motor and pull through the box.



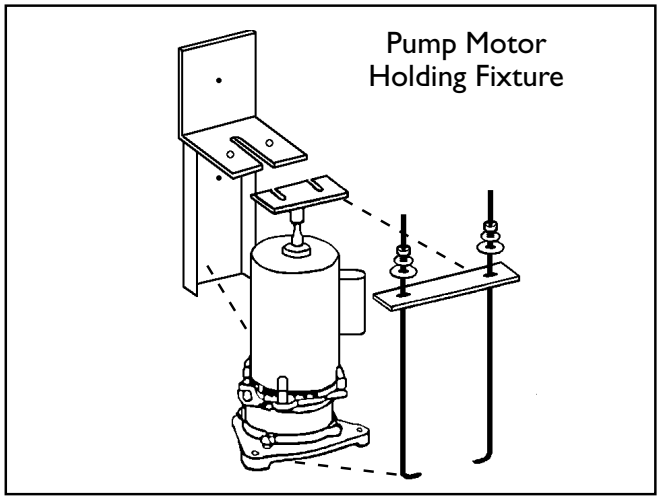
5. Remove the water line from the pump housing.
6. Remove the bolt from the bottom of the electrical box where the bracket is attached.
7. Remove the two screws and nuts from the terminal board located at the top of the electrical box *(old style)*.
8. Remove the chase nipple from inside the box where it screws to the motor.

Pump Removal/Disassembly

1. Remove the motor cover plate *(top of motor)*.
2. Shut **OFF** the valve supplying water to the pump.
3. Disconnect the vacuum and exhaust lines at the pump and install line closure plugs.
4. Disconnect the two motor wire leads from the electrical terminal.

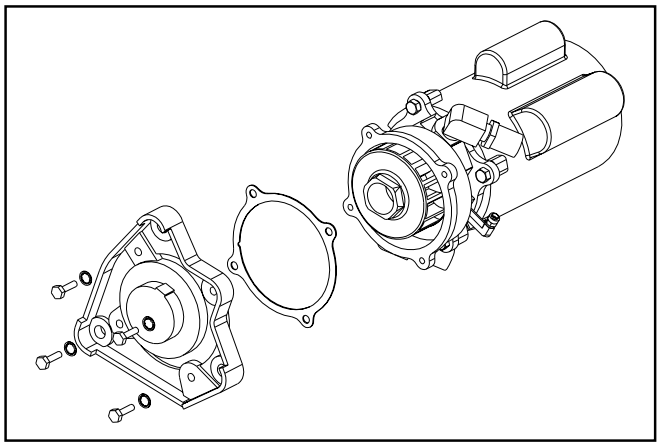


5. Disconnect the waste and input lines from the pump and cap off the lines using the closure plugs provided.
6. Disconnect the vacuum intake manifold.
7. Disconnect the water line at the pump.
8. Disconnect the low voltage wires from the remote switch circuit.
9. Mount the motor in the pump motor holding fixture by aligning the slot in the motor's shaft to the holding blade. Then connect the hold down brackets and tighten so the motor will not rotate in the fixture.

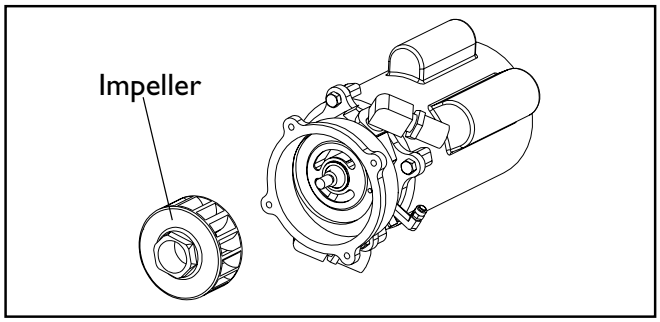


SYSTEM REPAIR PROCEDURE

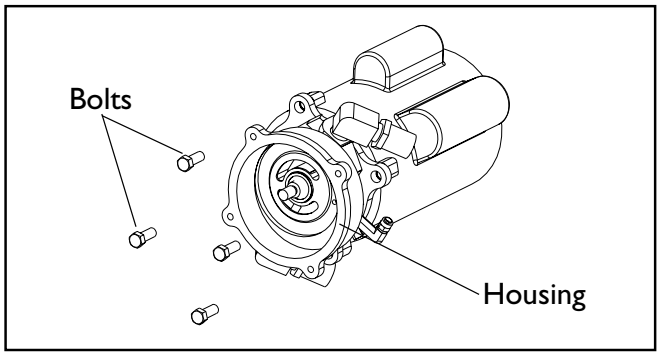
10. Take off the base by removing the bolts that secure it to the housing. Then inspect the base for excessive scoring or side wear.



11. Remove the impeller by unscrewing counterclockwise. Then inspect the impeller for any pitting or scoring.

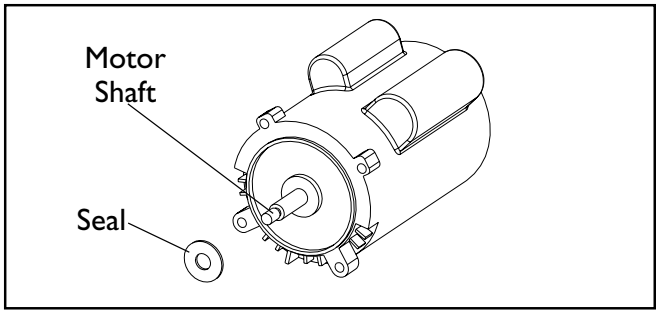


12. Remove the housing bolts and take off the housing by pulling it off the shaft.
13. Remove the water seal spring assembly then inspect the housing for pitting or scoring.

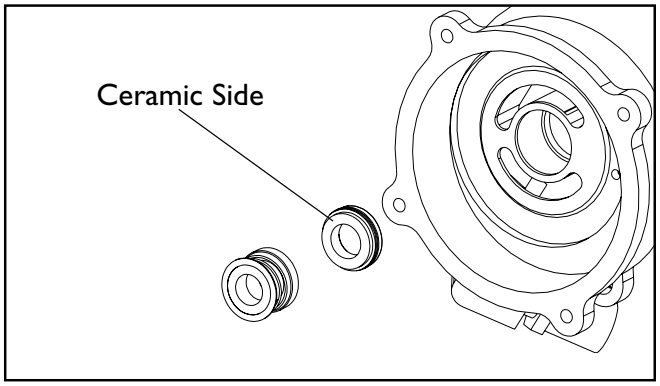


Pump to Motor Assembly

1. Apply lubricating oil to the motor shaft, seal and housing.



2. Press the seal into the housing with the ceramic side facing outward.



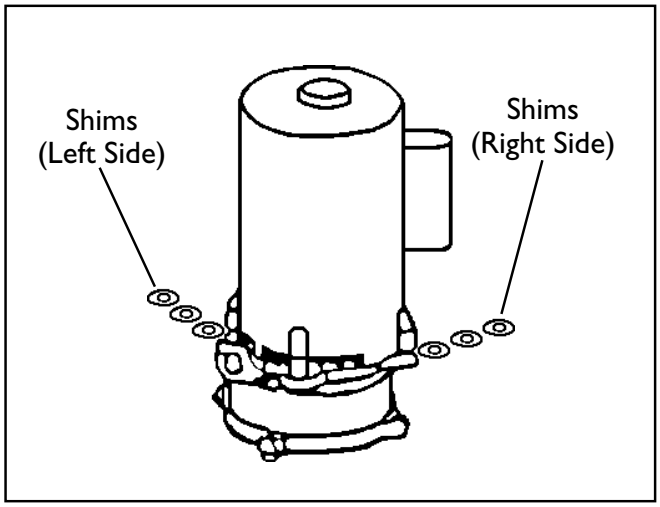
3. Carefully install the housing onto the motor shaft.
4. Install the black spring seal with the nylon side in contact with the ceramic washer.

   NOTE: *Lubrication of shaft will ease installation.*

5. Apply loctite to the threads of the motor shaft.
6. Screw the impeller onto the shaft with the flat side facing the motor.
7. Torque the impeller to 27 in. lbs.
8. Align the housing so that the electrical box mounting hole is opposite of the small elbow in back of the pump housing.

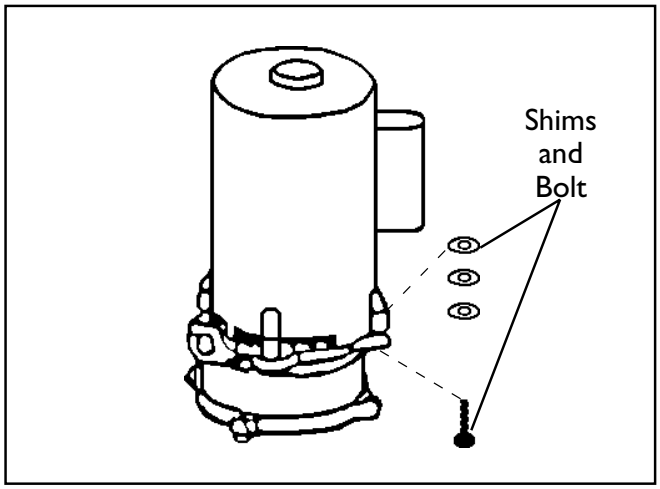
Housing/Impeller Spacing

1. To properly space the impeller to the housing, slide two or three .031" shims between the housing and the motor at one corner.



2. Slide other shims of various sizes diagonally across from the corner in Step 1, until the impeller is snug with the housing.
3. Remove and add up all the sizes of the shims used. EXAMPLE: A total of .100" is used, divide that by 2 to obtain .050". Use this amount minus an additional .005" from 1 HP pumps and .010" from 2 HP for each corner.

NOTE: *For further explanation, see Shimming Procedure.*



SHIMMING PROCEDURE

A. Insert shims between the motor and the housing at two opposite mounting legs until snug.

B. Remove and add up the total thickness of the shims from both sides.

EXAMPLE:

Left Side Shims	+	Right Side Shims
.031		.031
+.015		+.031
+.015		+.005
.061		.067

.061 + .067 = **.128**

C. Divide the total by 2 and subtract:
.005 for 1 HP motor
.010 for 2 HP motor

EXAMPLE: .128 ÷ 2 = **.064**
.064 −.005 = **.059**

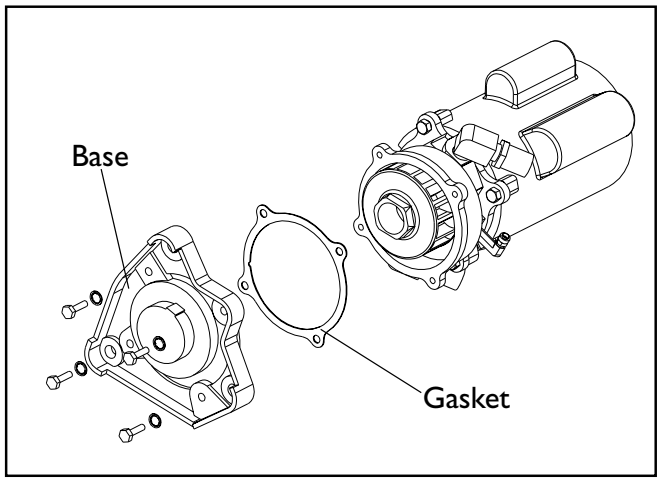
D. Use the best combination of shims for the required shim dimension.

EXAMPLE:

Required Shim Dimension	Combine Shims
.059	.031
	+.015
	+.010
	+.002
	.058

E. Install a bolt and equal shim combinations at all four locations.

4. Install the bolts and required shims.
5. Tighten and check for free spin of the impeller by removing the motor from the fixture and rotating the impeller. *(For proper fit, shims may need to be added or deleted.)*



6. Install the base with the gasket by aligning the intake and discharge ports. Then tighten the bolts *(**do not** over tighten)*.
7. Set the pump upright and insert a screwdriver into the slot on top of the motor and check for free spin and smooth operation of the pump.

Vacuum Pump Operation Testing

1. To check for proper operation of the vacuum pump, connect to an electrical source, water and waste line.
2. Start the pump, then block the suction side of the pump and the vacuum relief valve. *The vacuum level should read between 20-25 in. hg. Shims may need to be added or deleted for proper vacuum reading. (Refer to the Housing/ Impeller Spacing Section.)* *(On previous page)*
3. Set the vacuum level by unblocking the vacuum relief valve and adjusting the valve to 10-12 in. hg.
4. Operate the pump for approximately one hour continuously.
5. Check for any water leaks, electrical problems and consistent vacuum level.

Pump Removal

If the motor does not start after checking through the troubleshooting charts, the motor may be defective. If the pump must be removed for factory repair or replacement, perform the following steps:

1. Unplug the electrical supply cord.
2. Using the manual valve, turn **OFF** the water supply.
3. Disconnect the water line to the pump being removed.
4. Disconnect the waste and input lines from the pump being removed and cap off the lines using the closure plugs provided.
5. Disconnect the low voltage wires from the remove switch circuit.
6. Remove the wing nuts.

Vacuum Pump System Repair Procedure

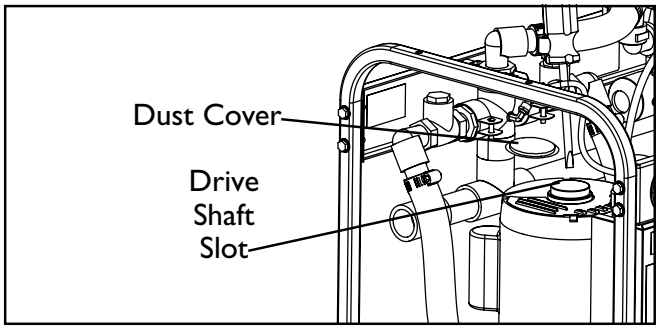
Tools Required:

- Wire Stripper/Crimper
- 1/4", 5/16", 11/32" and 3/8" Nut Driver
- 7/16", 1/2", 9/16" and 15/16" Open-end Wrench
- 1-3/4" Socket and Torque Wrench
- 15/16" Socket with Ratchet
- Hammer
- Flat-blade Screwdriver
- Wire Cutter
- Needle-nose Pliers
- Channel-lock Pliers
- Paint Scraper
- Pump Motor Holding Fixture: DTE# 64546001
- Pop Riveter
- Bench Vise
- Bearing Seal Lubricant
- Red Loctite/Pipe Sealant: Item# 57141

Test Procedure — Diagnostic

Determine if the required repair procedure is electrical or mechanical.

1. **Disconnect** the pump electrical cords from the receptacles.
2. At the needle valves, turn **OFF** the main water supply to the cabinet.
3. Remove the dust cover located at the top center of the motor.



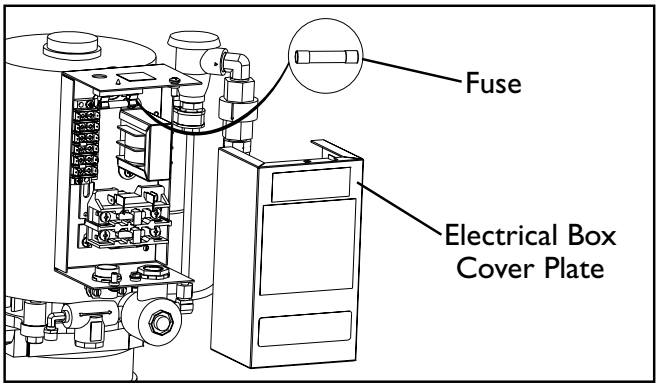
4. Using a flat-blade screwdriver, engage the slot in the drive shaft and rotate the shaft to check for free movement:
   - If the shaft moves smoothly, proceed to **Electrical Box Removal**.
   - If the shaft is difficult to turn or is jammed, proceed to **Pump Disassembly**.

SYSTEM REPAIR PROCEDURE

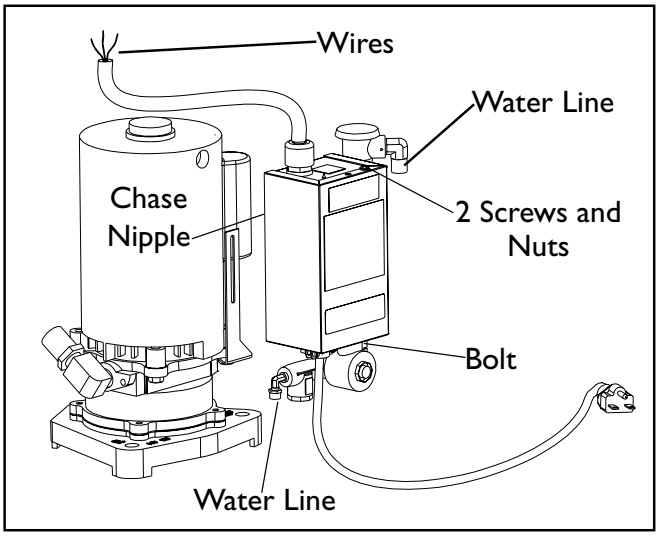
Electrical Box Removal

NOTE: *Most electrical repairs can be performed without removing the pump from the cabinet.*

1. Remove the electrical box cover plate.
2. Check the wire leads to the motor for breaks or bad connections.



3. Check the fuse and check for loose or broken wires in the electrical box.
4. Disconnect the wires from behind the face-plate of the cabinet and pull through the box.
5. Remove the two water lines from the water manifold.



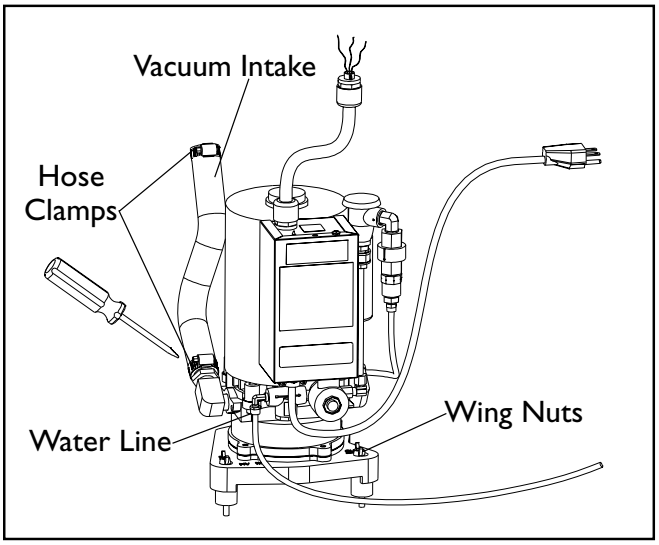
6. Remove the bolt from the bottom of the box where the bracket is attached.
7. Remove the two screws and nuts from the terminal board located at the top of the electrical box.
8. Remove the chase nipple from inside the box where it screws to the motor.

Pump Disassembly

1. Remove the motor cover plate *(top of motor)*.
2. Remove the front plate from the cabinet.
3. Remove the nut from the vacuum relief valve.
4. Disconnect the three electrical box wires from the switch located behind the faceplate of the cabinet.

Motor Pump Assembly Removal

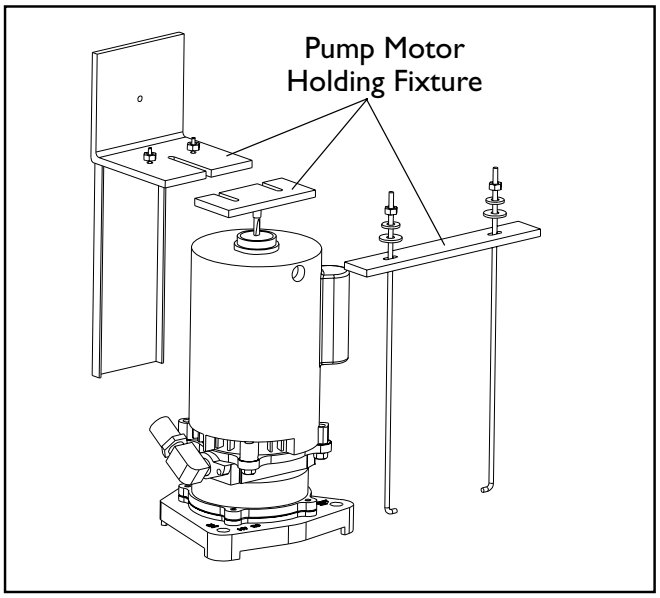
1. Disconnect the pump's vacuum and exhaust lines and install line closure plugs.
2. Disconnect the pump's water line.



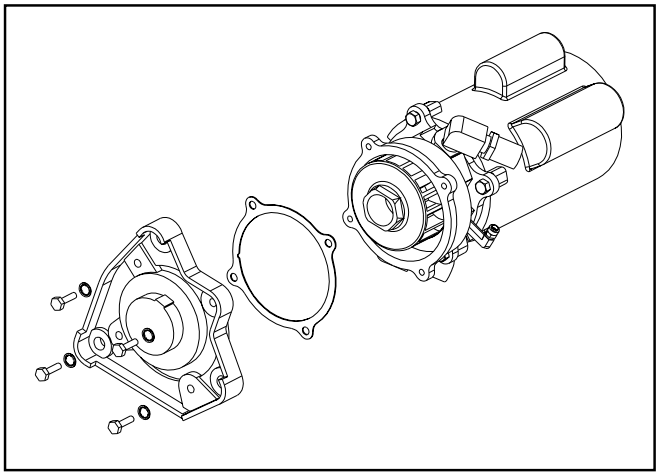
3. Shut **OFF** the valve at the water control manifold.
4. Remove the wing nuts from the pump's base. *(four nuts - 2 HP pump; three nuts - 1 HP pump)*

SYSTEM REPAIR PROCEDURE

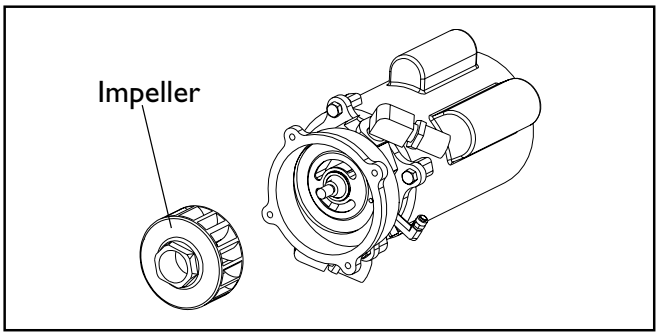
5. Disconnect the two motor wire leads from the electrical terminal.



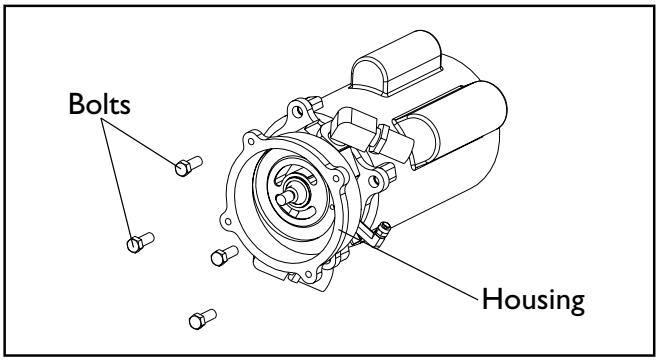
6. Mount the motor in the pump motor holding fixture *(DTE# 64546001)* by aligning the slot in the motor's shaft to the holding blade. Then connect the hold down brackets and tighten so the motor will not rotate in the fixture.



7. Take off the base by Removing the bolts that secure it to the housing. Then inspect the base for excessive scoring or side wear.



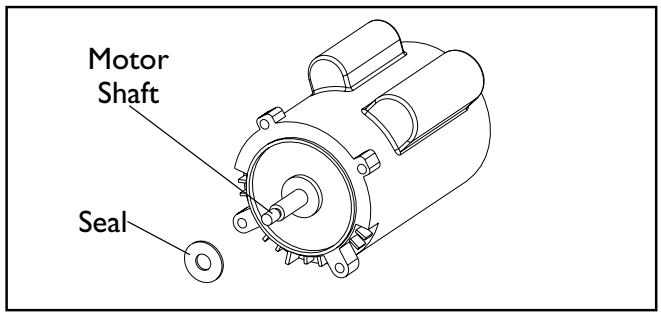
8. Remove the impeller by unscrewing counterclockwise. Then inspect the impeller for any pitting or scoring.



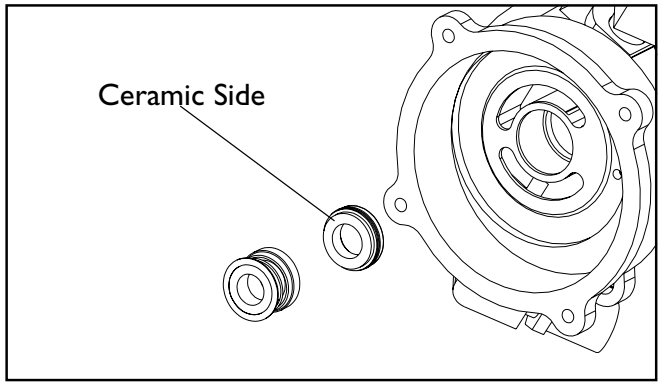
9. Remove the housing bolts and take off the housing by pulling it off the shaft.
10. Remove the water seal spring assembly.
11. Inspect the housing for pitting or scoring.

Pump to Motor Assembly

1. Apply lubricating oil to the motor shaft, seal and housing.



2. Press the seal into the housing with the ceramic side facing outward.

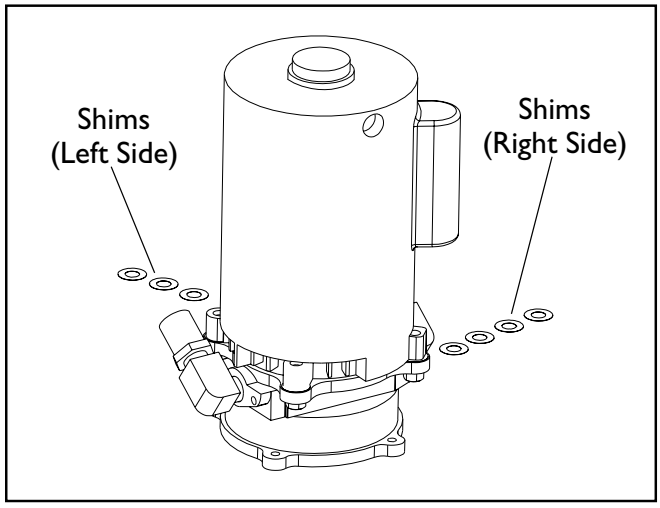


3. Carefully install the housing onto the motor shaft.
4. Install the black spring seal with the nylon side in contact with the ceramic washer.

   NOTE: *Lubrication of the motor shaft will ease installation.*
5. Apply loctite to the threads of the motor shaft.
6. Screw the impeller onto the shaft with the flat side facing the motor.
7. Torque the impeller to 27 in. lbs.
8. Align the housing so that the small elbow is opposite the electrical box mounting hole in the motor.

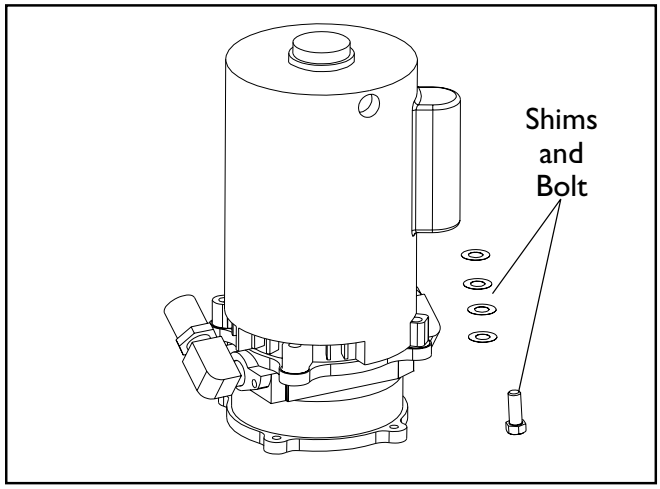
Housing/Impeller Spacing

1. To properly space the impeller to the housing, slide two or three .031" shims between the housing and the motor at one corner.



2. Slide other shims of various sizes diagonally across from the corner in Step 1, until the impeller is snug with the housing.
3. Remove and add up all the sizes of the shims used. EXAMPLE: A total of .100" is used, divide that by 2 to obtain .050". Use this amount minus an additional .005" from 1 HP pumps and .010" from 2 HP for each corner.

   NOTE: *For further explanation, see Shimming Procedure.* *(On next page)*



SYSTEM REPAIR PROCEDURE

SHIMMING PROCEDURE

A. Insert shims between the motor and the housing at two opposite mounting legs until snug.

B. Remove and add up the total thickness of the shims from both sides.

EXAMPLE:	Left Side Shims	+	Right Side Shims
	.031		.031
	+.015		+.031
	+.015		+.005
	.061		.067

.061 + .067 = **.128**

C. Divide the total by 2 and subtract:
.005 for 1 HP motor
.010 for 2 HP motor

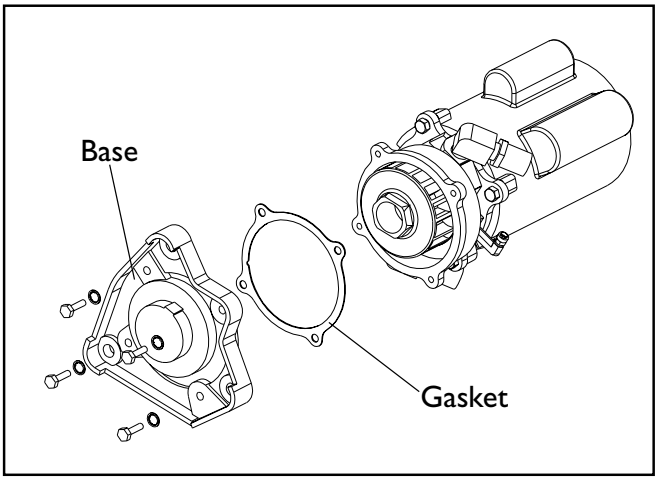
EXAMPLE: .128 ÷ 2 = **.064**
.064 −.005 = **.059**

D. Use the best combination of shims for the required shim dimension.

EXAMPLE: Required Shim Dimension	Combine Shims
.059	.031
	+.015
	+.010
	+.002
	.058

E. Install a bolt and equal shim combinations at all four locations.

4. Install the bolts and required shims.
5. Tighten and check for free spin of the impeller by removing the motor from the fixture and rotating the impeller. *(For proper fit, shims may need to be added or deleted.)*



6. Install the base with the gasket by aligning the intake and discharge ports. Then tighten the bolts *(**do not** over tighten)*.
7. Set the pump upright and insert a screwdriver into the slot on top of the motor.
8. Check for free spin and smooth operation of the pump.

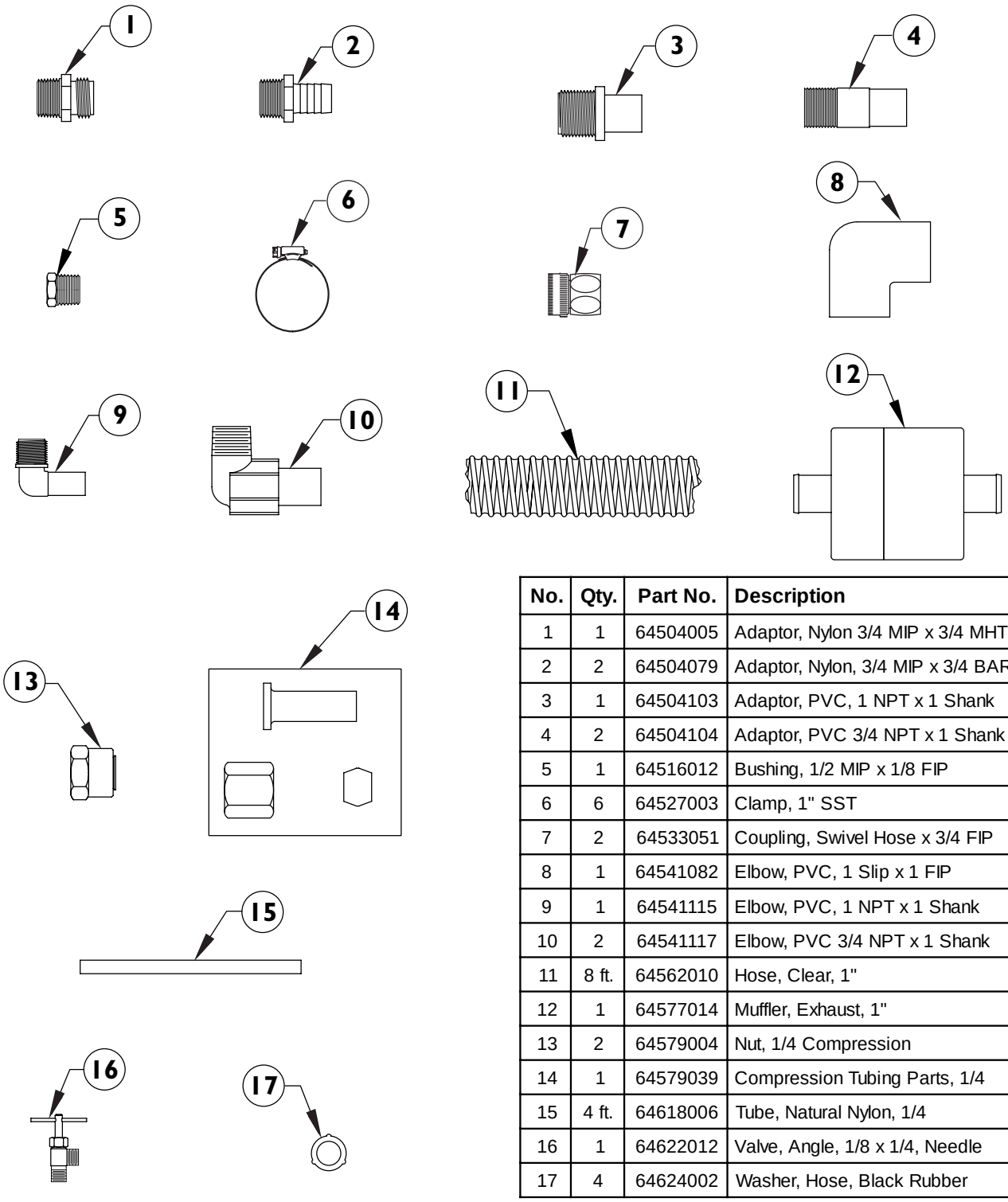
Vacuum Pump Operation Testing

1. To check for proper operation of the vacuum pump, connect to an electrical source, water and waste line.
2. Start the pump, then block the suction side of the pump and the vacuum relief valve. *The vacuum level should read between 20 -25 in hg. Shims may need to be added or deleted for proper vacuum reading. (Refer to the Housing/ Impeller Spacing Section.)* *(On previous page)*
3. Operate the pump for approximately one hour continuously.
4. Check for any water leaks, electrical problems and consistent vacuum level.

SYSTEM REPAIR PROCEDURE

Installation Kit

Each vacuum pump is supplied with an installation kit *(PN: 64568036)*.



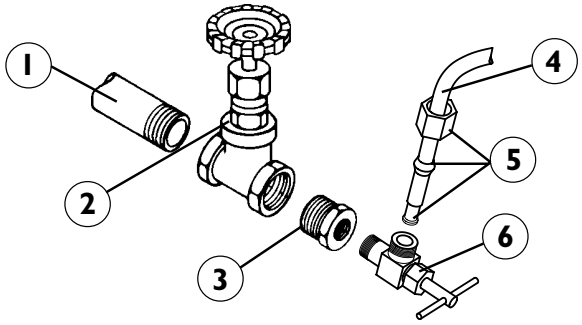
No.	Qty.	Part No.	Description
1	1	64504005	Adaptor, Nylon 3/4 MIP x 3/4 MHT
2	2	64504079	Adaptor, Nylon, 3/4 MIP x 3/4 BARB
3	1	64504103	Adaptor, PVC, 1 NPT x 1 Shank
4	2	64504104	Adaptor, PVC 3/4 NPT x 1 Shank
5	1	64516012	Bushing, 1/2 MIP x 1/8 FIP
6	6	64527003	Clamp, 1" SST
7	2	64533051	Coupling, Swivel Hose x 3/4 FIP
8	1	64541082	Elbow, PVC, 1 Slip x 1 FIP
9	1	64541115	Elbow, PVC, 1 NPT x 1 Shank
10	2	64541117	Elbow, PVC 3/4 NPT x 1 Shank
11	8 ft.	64562010	Hose, Clear, 1"
12	1	64577014	Muffler, Exhaust, 1"
13	2	64579004	Nut, 1/4 Compression
14	1	64579039	Compression Tubing Parts, 1/4
15	4 ft.	64618006	Tube, Natural Nylon, 1/4
16	1	64622012	Valve, Angle, 1/8 x 1/4, Needle
17	4	64624002	Washer, Hose, Black Rubber

Water Supply Line

The water going to the unit acts as a pump sealant and cooling agent. When the vacuum pump is in operation, the water supply must be on at all times. There are two methods of installation:

1/8" MIP Angle Valve Installation

The plumber supplies the water line and installs a 1/2" brass gate valve on the water supply line. Connect the 1/4" nylon tubing and slide the nut and brass ferrule over the tubing. Push the tubing in the valve as far as possible. Make sure the tapered end of the ferrule is facing the end of the tubing and tighten the nut.

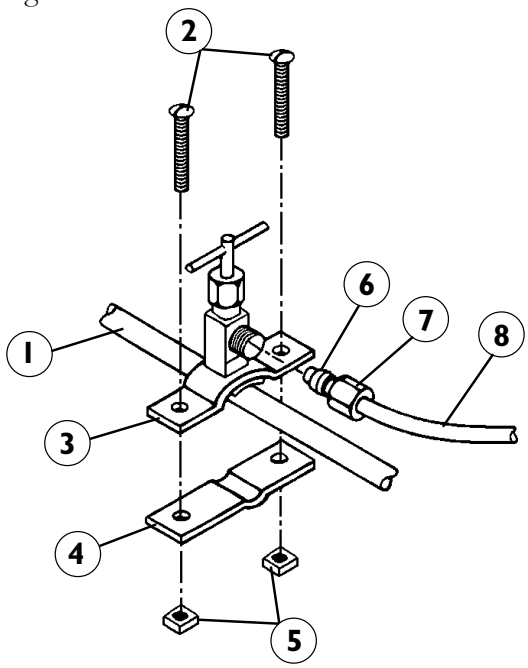


Angle Valve Installation			
No.	Qty.	Part No.	Description
1	1	*	Water Line
2	1	*	Valve, Gate, Brass, 1/2"
3	1	64516012	Bushing, Brass, 1/2" MIP x 1/8" FIP
4	4 ft.	64618006	Tube, Nylon, 1/4"
5	1	64579039	Compressions Tubing Parts, 1/4"
6	1	64622012	Valve, Angle, 1/8" x 1/4", needle

* Plumber Supplies

Saddle Valve Installation

A saddle valve may be tapped into an existing cold water line. Follow the instructions on the saddle valve package.



Saddle Valve Installation			
No.	Qty.	Part No.	Description
1	1	*	Water Line
2-7	1	*	Saddle Valve, 1/4", Complete Kit
8	4 ft.	64618006	Tube, Nylon, 1/4"

* Plumber Supplies

PARTS LISTS

Vacuum Line

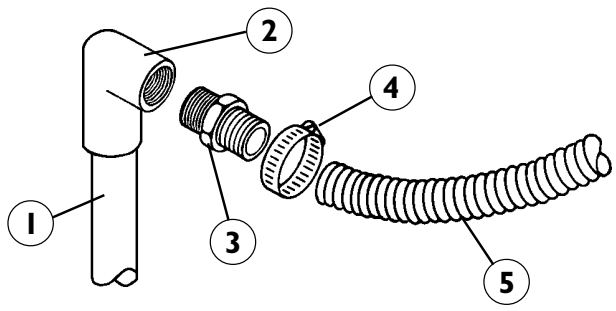
— IMPORTANT —

All vacuum systems must be installed according to local building and electrical codes.

Vacuum lines must be installed by a local plumber according to local building codes. All vacuum lines and risers are recommended to be IPS, PVC, SCH. 40. Type "M" copper should be used if local code does not allow the use of PVC.

Care should be taken to slope the lines 1" for every 20' of run toward the vacuum pump(s). This allows waste and liquids to flow with gravity, contributing to the efficiency of the vacuum system.

Make all connections using long radius sweep fittings. To promote unrestricted flow of air and waste liquids through the vacuum lines, directional flow connections should be used.



Using 45° elbows for turns or avoiding obstructions is best; however, do not make a trap in the line, doing so will decrease the efficiency of the system.

All elbows and tees should be sized for the main line and sized down with bushing reducers to accommodate smaller lines.

Avoid sagging lines, which cause the formation of traps in the system and prevent good air and waste liquid flow.

Connect the evacuation system to the vacuum line using the hose and fittings supplied in the installation kit.

No.	Qty.	Part No.	Description
1		*	Vacuum Line, IPS, PVC, SCH. 40
2	1	64541115	Elbow, 1" x 1"
3	1	64504103	Adapter, PVC, 1" x 1"
4	1	64527003	Clamp, Stainless Steel, 1"
5	4 ft.	64562010	Hose, Intake, 1"

* Supplied by Plumber

PARTS LISTS

Waste Line

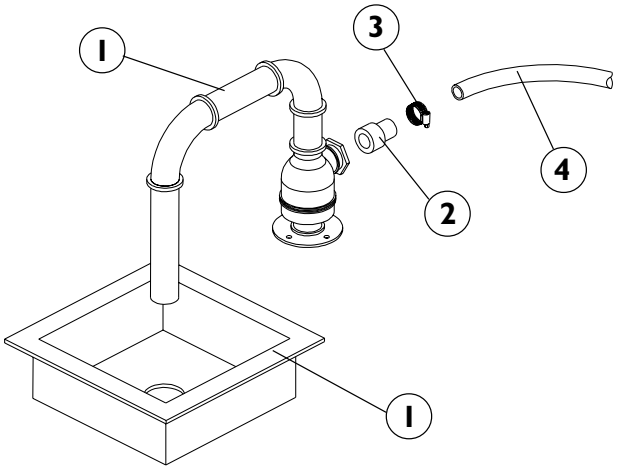
The waste line carries water from the pumps and liquid waste from the operatory to the building's sewer system.

The waste line should follow the most direct path to the sewer connection with a minimum of bends and elevations, and must be installed according to local building and plumbing codes.

The exhaust connection should be made by either of two methods, floor sink connection or direct connection to "P" trap, depending on local code and building facilities.

Floor Sink Connection

Use floor sink adapter SA-100. Install as illustrated.



No.	Qty.	Part No.	Description
1*	1	**	Adapter, PVC, Floor Sink, 1"
2*	1	64504102	Adapter, PVC, 1" INS. x 1"
3	1	64527003	Clamp, Stainless Steel, 1"
4	3 ft.	64562010	Hose, Exhaust, 1"
5	1	Plumber Supplies	Floor Sink

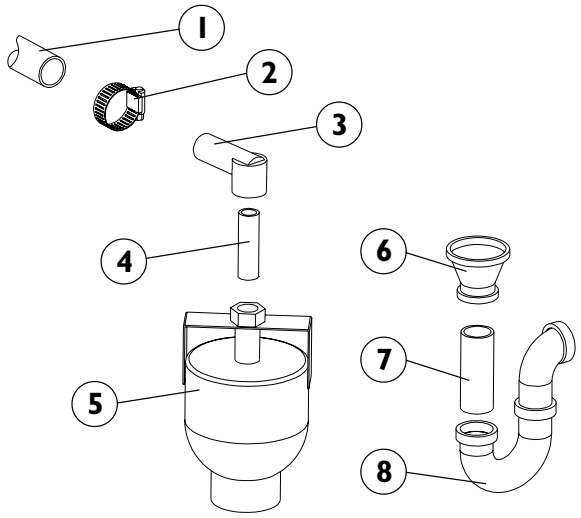
* Floor Sink Adapter Parts
* Supplied by Plumber

— IMPORTANT NOTE —

No part of the waste line should be more than three (3) feet above the level of the waste connection on the vacuum pump.

Direct Connection to "P" Trap

Use "P" trap-air gap, if required by local code. Install as illustrated.

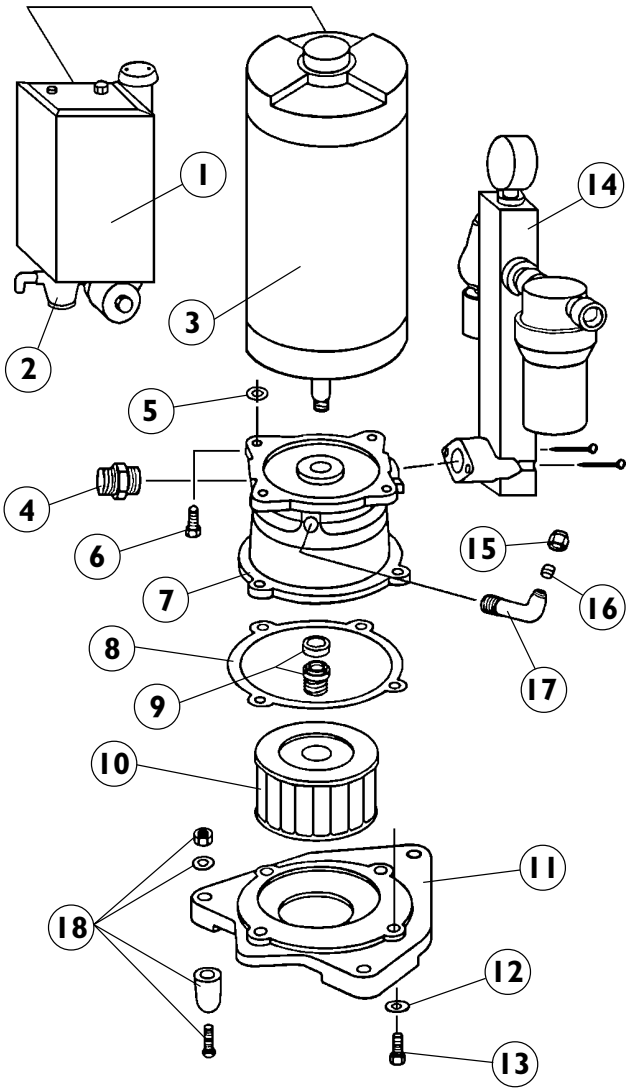


No.	Qty.	Part No.	Description
1	1	64562010	Hose, Exhaust, 1"
2	1	64527003	Clamp, Stainless Steel, 1"
3	1	*	Elbow, Brass, 1" x/Nut
4	1	*	Bushing, PVC, 1" MIP x 1" FIP
5	1	*	Adapter, Air Gap, 2"
6	1	*	Reducer, Bell, 2" x 1-1/2", Galv.
7	1	*	Nipple, 1-1/2" x Close, Galv.
8	1	*	Trap, "P", 1-1/2"

* Supplied by Plumber

1 HP Single Pump Assembly

No.	Qty.	Part No.	Description
	1	64586101	Hi Vac, 1 HP
1	1	64501150R	Relay Unit, 115V, 230V
2	1	64568196	Water Manifold, 1/2 gallon
3	1	64575059	Motor, 1 HP, FS
4	1	64568146	Adaptor, Brass, 3/4" x 1/2"
*5	As Req.	64604001 64604002 64604003 64604004 64604005	Shim, Steel .005 Thick Shim, Steel .031 Thick Shim, Steel .015 Thick Shim, Steel .002 Thick Shim, Steel .010 Thick
*6	4	1615-028	Cap Screw, 3/8" --16 x 1"
*7	1	64568199	Housing, Brass, 1 HP
*8	1	64568127	Housing Gasket, Fiber
*9	1	64568123	Housing Seal, Rotary
*10	1	64568198	Impeller, Brass, 1 HP
*11	1	64568168	Base, Brass, 1 HP
*12	4	64624016	Washer, Internal Star, 5/16"
*13	4	64611044	Screw, Cap, 5/16"-18 x 1"
*5-13	1	64568125	Lower Rebuild Kit, 1 HP
14	1	64568164	Manifold, Intake, w/Gauge and Valve
15	2	64579004	Nut, 1/4" Tube, Compression
16	2	64610002	Sleeve, 1/4", Compression
17	1	64568155	Elbow, 1/4" x 1/4"
18	1	64568003	Mounting Feet Kit, 1 HP
	1	64514054	Bracket, Electrical Box to Motor, Stabilizer

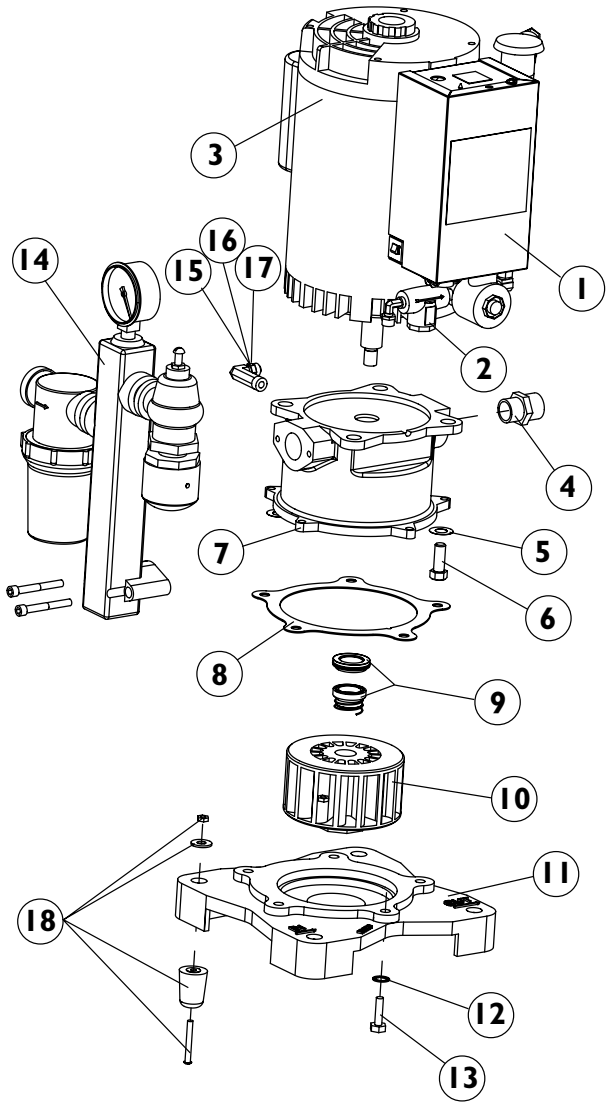


NOTE: *See the Operation/Maintenance section of this manual for detailed information on hookup and care of the Single Wet Vacuum Pump.*

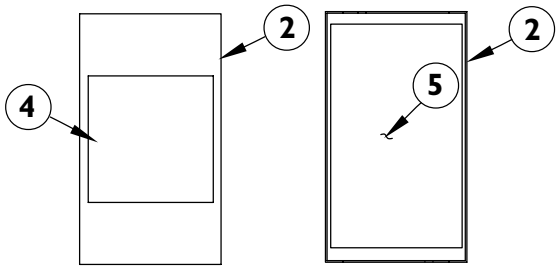
PARTS LISTS

2 HP Single Pump Assembly

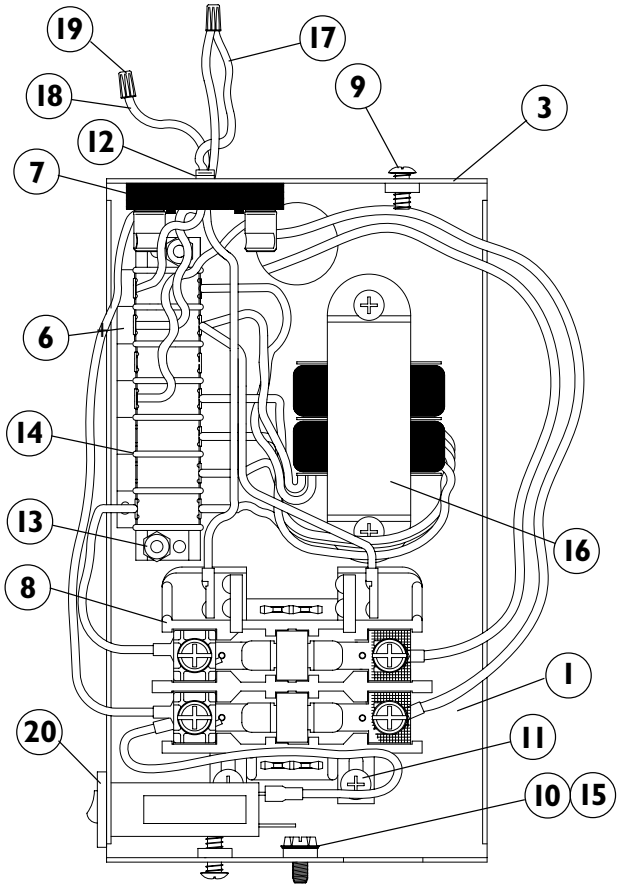
No.	Qty.	Part No.	Description
	1	64586102	Hi Vac, 2 HP
1	1	64501150R	Relay Unit, 230V
2	1	64568197	Water Manifold, 1 gallon
3	1	64575060	Motor, 2 HP, FS
4	1	64568147	Adaptor, Brass, 3/4" x 1/2"
*5	As Req.	64604001 64604002 64604003 64604004 64604005	Shim, Steel .005 Thick Shim, Steel .031 Thick Shim, Steel .015 Thick Shim, Steel .002 Thick Shim, Steel .010 Thick
*6	4	1615-028	Cap Screw, 3/8" - 16 x 1"
*7	1	64568200	Housing, Brass, 2 HP
*8	1	64568128	Housing Gasket, Fiber
*9	1	64568124	Housing Seal, Rotary
*10	1	64568189	Impeller, Brass, 2 HP
*11	1	64568168	Base, Brass, 2 HP
*12	5	64624016	Washer, Internal Star, 5/16"
*13	5	64611044	Screw, Cap, 5/16"-18 x 1"
*5-13	1	64568126	Lower Rebuilt Kit, 2 HP
14	1	64568164	Manifold, Intake, w/Gauge and Valve
15	2	64579004	Nut, 1/4" Tube, Compression
16	2	64610002	Sleeve, 1/4", Compression
17	1	64568155	Elbow, 1/4" x 1/4"
18	1	64568004	Mounting Feet Kit, 2 HP
	1	64514054	Bracket, Electrical Box to Motor, Stabilizer



Electrical Box



No.	Qty.	Part No.	Description
	1	64501150	Electrical Box Assembly, 115V or 230V
1	1	64513011	Control Box Chassis
2	1	64513011B	Control Box Cover
3	1	64529027	Decal, Low, 24V
4	1	64529174	Decal, Fire/Shock Warning
5	1	64529182	Decal, D V Elec. Diagram
6	1	64529185	Decal, D V Terminal Block
7	1	64561004	Fuse Clip Holder
8	1	64568133	Relay, 30 AMP Capacity
9	2	1623-054	Screw, 10-32 x 1/2"
10	1	64611060	Screw, 10-32 Green, Ground
11	4	64611085	Screw, 8 x 1/4" Phillips
12	1	64611119	Screw, 6-32 x 5/16", Fuse Holder
13	2	64611120	Screw, 6-32, Terminal Board
14	1	64615023	Terminal Brd, 7 Qk. Connect
15	1	1636-026	Lock Washer, #10 Int'l star
16	1	64568195	Primary Trans., 115/230V
17	1	64529025	Decal, Caution Low Volts
18	1	64529203	Tag, Wire Usage Warning
19	2	64626003	Wire Nut, Ideal, 71-B Gray
	1	64618068	Conduit, Black
	1	64624058	Washer, 7/8"
	2	64578001	Nipple, Chase, 1/2"
	1	64625073	Wire, 18 Ga., Purple, 6"
*	1	64501151	Electrical Box Assembly Kit, 115/230V (1HP)
*	1	64501157	Electrical Box Assembly Kit, 230V (2 HP)
20	1 1	3802-120 3801-911	Circuit Breaker, 15 AMP or Circuit Breaker, 8 AMP



No.	Qty.	Part No.	Description
	1	64532008	Cord, 230V
	1 1	64529186 64529187	Decal, Fuse Replacement 3/10A, 115V or Decal, Fuse Replacement 15/100A, 230V
	1 1	64529125 64529126	Decal, 230V, 7.5A, 60 Hz (1 HP Dual) or Decal, 230V, 15A, 60 Hz (2 HP)
	1	2679-497	Decal, Ground
	1	64531025	Connector, Snap-in, Black
	1	64579001	Nut, Locking, 1/2"
	1 1	64568131 64568130	Fuse, 3/10 Amp, Slo-Blo, 115V (pkg. of 4) or Fuse, 15/100 Amp, Slo-Blo, 230V (pkg. of 4)

***NOTE:** *Electrical Box Assembly Kits: Part Nos. 64501151, 115/230V (1 HP) and PN 64501157, 230V (2 HP) are complete with water manifold attached.*

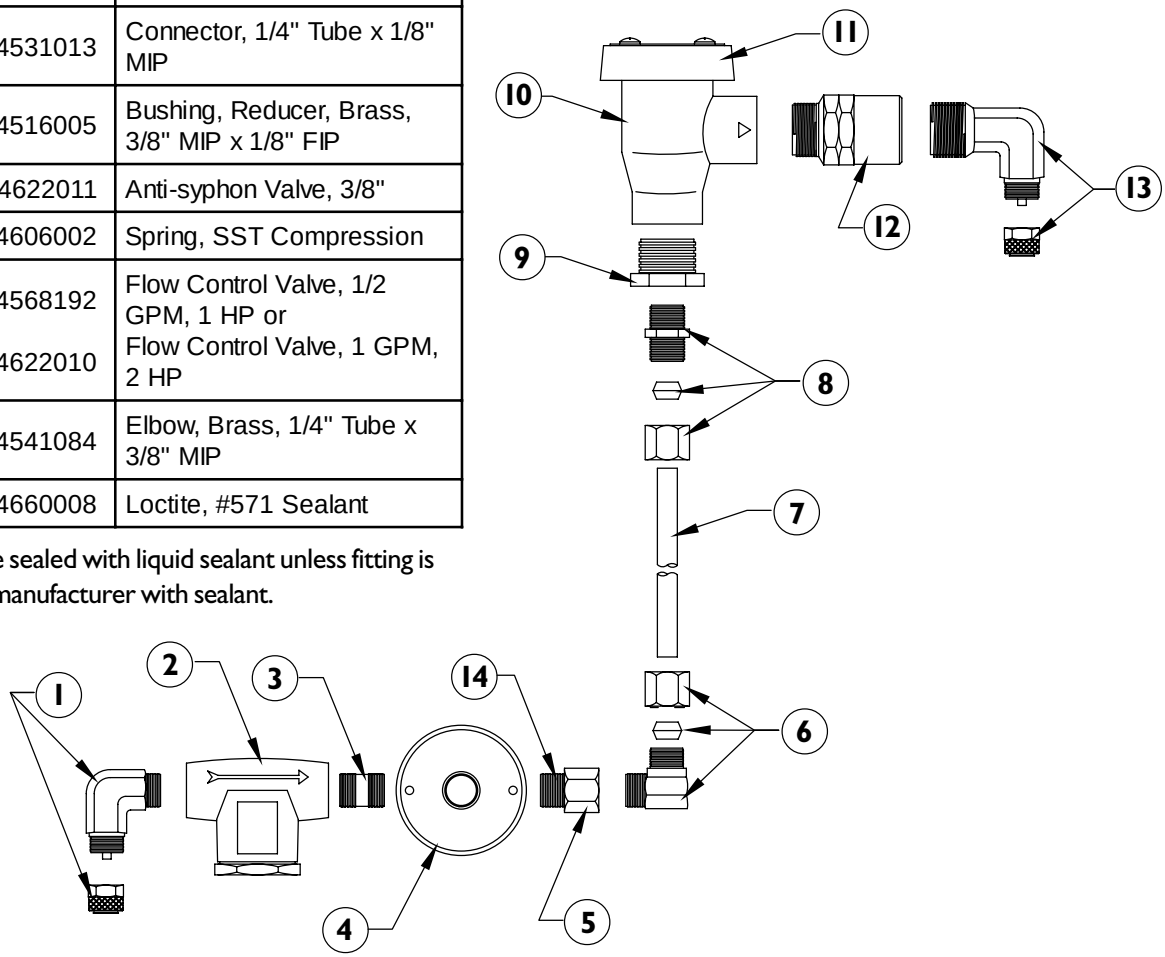
PARTS LISTS

Water Control Assembly

No.	Qty.	Part No.	Description
	1 1	64568196 64568197	Water Control Assy., 1 HP Water Control Assy., 2 HP
1	1	64541004	Elbow, Brass, 1/4" Tube x 1/8" MIP
2	1	64568135	Water Filter, 1/8"
3	1	64578002	Nipple, Brass, 1/8" MIP
4	1	64568156	Solenoid Valve, 24v, 60hz
5	1	64504072	Adapter, Brass, 1/8" MIP x 1/8" FIP
6	1	64541106	Elbow, Brass, 1/4" Comp. x 1/8" MIP
7	1	64568154	Watertube, 6" Straight
8	1	64531013	Connector, 1/4" Tube x 1/8" MIP
9	1	64516005	Bushing, Reducer, Brass, 3/8" MIP x 1/8" FIP
10	1	64622011	Anti-syphon Valve, 3/8"
11	1	64606002	Spring, SST Compression
12	1	64568192 64622010	Flow Control Valve, 1/2 GPM, 1 HP or Flow Control Valve, 1 GPM, 2 HP
13	1	64541084	Elbow, Brass, 1/4" Tube x 3/8" MIP
14*	AR	64660008	Loctite, #571 Sealant

* All Fittings to be sealed with liquid sealant unless fitting is pretreated from manufacturer with sealant.

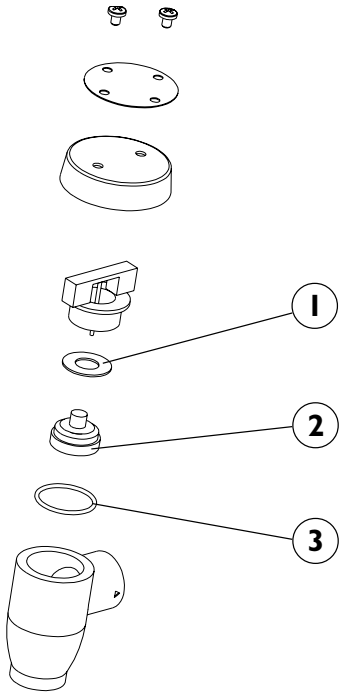
The water control system of the CustomAir Single Wet Vacuum Pump provides the pump with the water flow required for proper suction and supplemental cooling. Automatic and independent water control is provided for the pump. Filters protect the system from damage because of solid materials in the water supply. Flow valves control the amount of water supplied to the pump.



PARTS LISTS

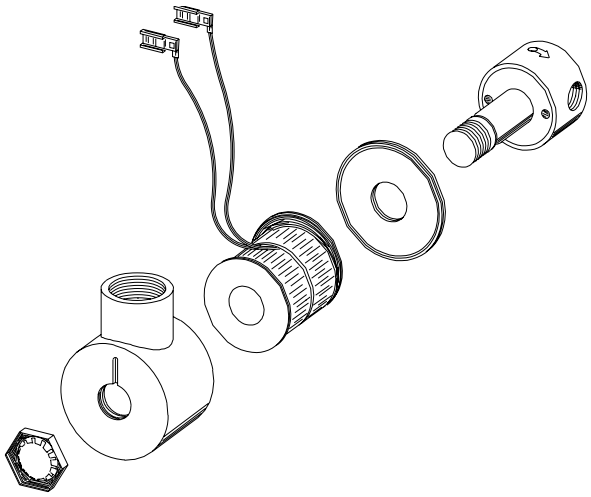
Anti-Siphon Valve Assembly

No.	Qty.	Part No.	Description
	1	64622011	Anti-Siphon Valve Assembly
1,2,3	1	64568016A	Anti-Siphon Repair Kit



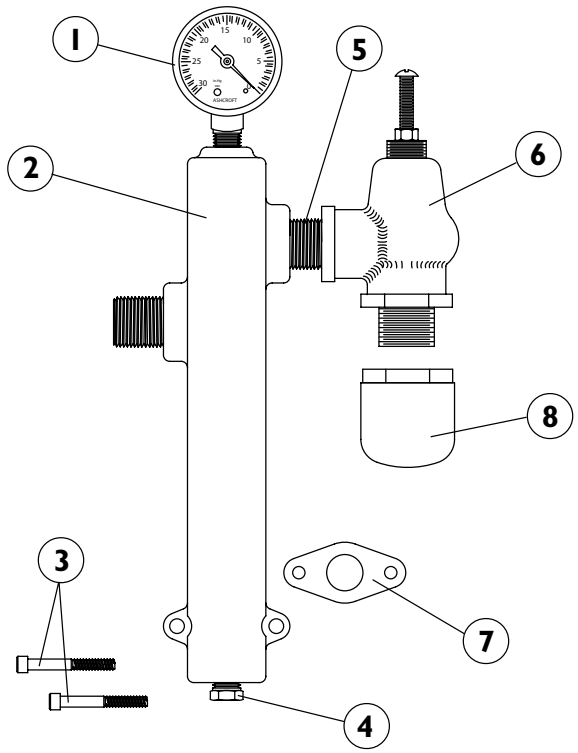
Water Solenoid Valve Assembly

No.	Qty.	Part No.	Description
	1	64568156	Water Solenoid Valve Assembly, 24V

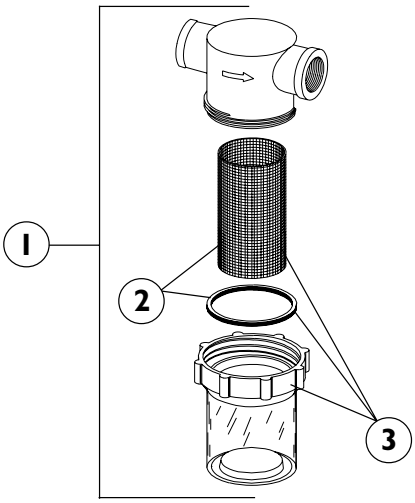


Intake Manifold Assembly

No.	Qty.	Part No.	Description
	1	64568164	Intake Manifold Assy, HiVac
1	1	64568188	Vacuum Gauge, 2"
2	1	64572001	Intake Manifold, Brass
3	2	64611059	Socket Head Cap Screw, 1/4"-20 x 2"
4	1	64584009	Plug, 3/8", Brass
5	2	64578003	Nipple, 3/4" x Close, Brass
6	1	64622001	Vacuum Relief Valve, Brass
7	1	64568137	Manifold Gasket, Fiber
8	1	64568159	Vacuum Relief Muffler



Primary / Secondary Filter

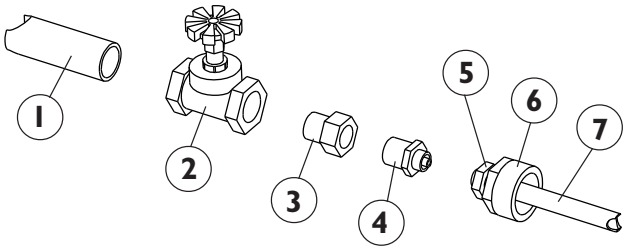


No.	Qty.	Part No.	Description
1	1	64545040	Filter, Primary, 3/4", with clear bowl
2	1	64568119	Screen & Gasket
3	1	64568120	Bowl, Screen & Gasket

PARTS LISTS

Water Supply Line

The water going to the unit acts as a pump sealant and cooling agent. When the vacuum pump is in operation, the water supply must be on at all times. The plumber supplies and installs a 1/2" gate valve on the water supply line. Connect the 3/8" nylon tubing and fittings, which are supplied with the unit, as illustrated.



No.	Qty.	Part No.	Description
1	1	*	Water Line
2	1	*	Valve, Gate, Brass, 1/2"
3	1	64516041	Bushing, Brass, 1/2" MIP x 3/8" FIP
4	1	64504067	Adapter, Brass, 3/8" MIP x 3/8" Tube
5	1	64610007	Sleeve, Compression, Brass, 3/8"
6	1	64579027	Nut, Brass, 3/8", Nylon Tube
7	4 ft.	64618046	Tube, Nylon, 3/8"

* Plumber Supplies

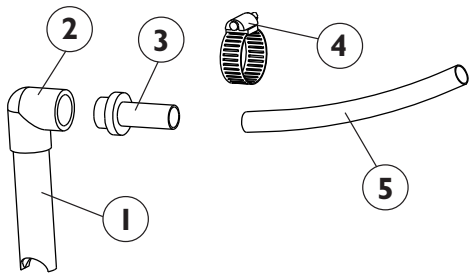
Vacuum Line

Vacuum lines must be installed by a local plumber according to local building codes. All vacuum lines and risers are recommended to be IPS, PVC, SCH. 40. Type "M" copper should be used if local code does not allow the use of PVC.

Care should be taken to slope the lines 1" for every 20' of run toward the vacuum pump(s). This allows waste and liquids to flow with gravity, contributing to the efficiency of the vacuum system.

Make all connections using long radius sweep fittings. To promote unrestricted flow of air and waste liquids through the vacuum lines, directional flow connections should be used.

Using 45º elbows for turns or avoiding obstructions is best; however, do not make a trap in the line, doing so will decrease the efficiency of the system.



All elbows and tees should be sized for the main line and sized down with bushing reducers to accommodate smaller lines.

Avoid sagging lines, which cause the formation of traps in the system and prevent good air and waste liquid flow.

Connect the evacuation system to the vacuum line using the hose and fittings supplied in the installation kit. The vacuum line can be installed from the right or left side of the cabinet.

No.	Qty.	Part No.	Description
1		*	Vacuum Line, IPS, PVC, SCH. 40
2		*	Elbow, IPS, PVC, SCH. 40
3	1	64568153	Adapter, PVC 1" MIP x 1-1/2" Shank
4	1	64527004	Clamp, 1-1/2" Hose
5	6 ft.	64562019	Hose, 1-1/2"

* Plumber Supplies

PARTS LISTS

Waste Line

The waste line carries water and liquid waste from the operatory to the building's sewer system.

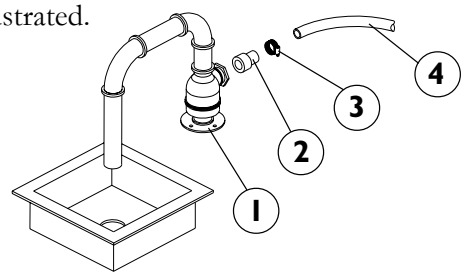
The waste line should follow the most direct path to the sewer connection with a minimum of bends and elevations, and must be installed according to local building and plumbing codes.

The waste line can be installed from the right or left side of the cabinet.

The exhaust connection should be made by either of two methods, floor sink connection or direct connection to "P" trap, depending on local code and building facilities.

FLOOR SINK CONNECTION

Use floor sink adapter SA-200, Part No. 6-4504-013. Install as illustrated.



No.	Qty.	Part No.	Description
1	1	*	Adapter, PVC, Floor Sink, 1" Barbed Insert
2	1	64568153	Adapter, PVC, 1" MIP x 1-1/2" Shank
3	1	64527003	Clamp, Stainless Steel, 1-1/2"
4	6 ft.	64562019	Hose, Exhaust, 1-1/2"

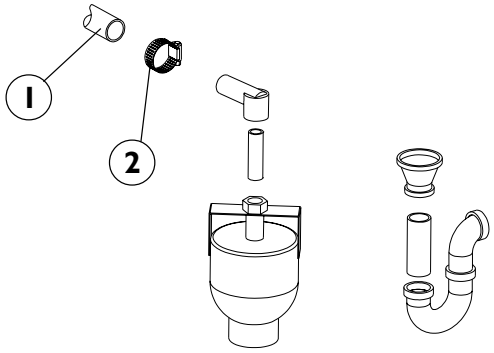
* Plumber Supplies

— IMPORTANT NOTE —

No part of the waste line should be more than three (3) feet above the level of the waste connection on the vacuum pump.

DIRECT CONNECTION TO "P" TRAP

Use "P" trap-air gap, if required by local code. Install as illustrated.

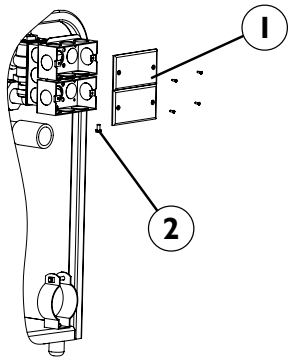


No.	Qty.	Part No.	Description
1	6 ft.	64562019	Hose, Exhaust, 1-1/2"
2	1	64527003	Clamp, Stainless Steel, 1-1/2"
3	1	*	Elbow 1-1/2"
4	1	*	Nipple, 1-1/2"
5	1	*	Adapter, Air Gap, 2"
6	1	*	Reducer, Bell, 2" x 1-1/2"
7	1	*	Nipple, 1-1/2" x Close
8	1	*	Trap, "P", 1-1/2"

Electrical Connection Assembly

Complete the electrical hook-up, as the electrical codes require, through the .375" hole in the box cover.

No.	Qty.	Part No.	Description
1	1	64513021	Cover Plate Screw
2	1	62584484	Cover Plate, J-Box
3	1	64611060	Ground Screw

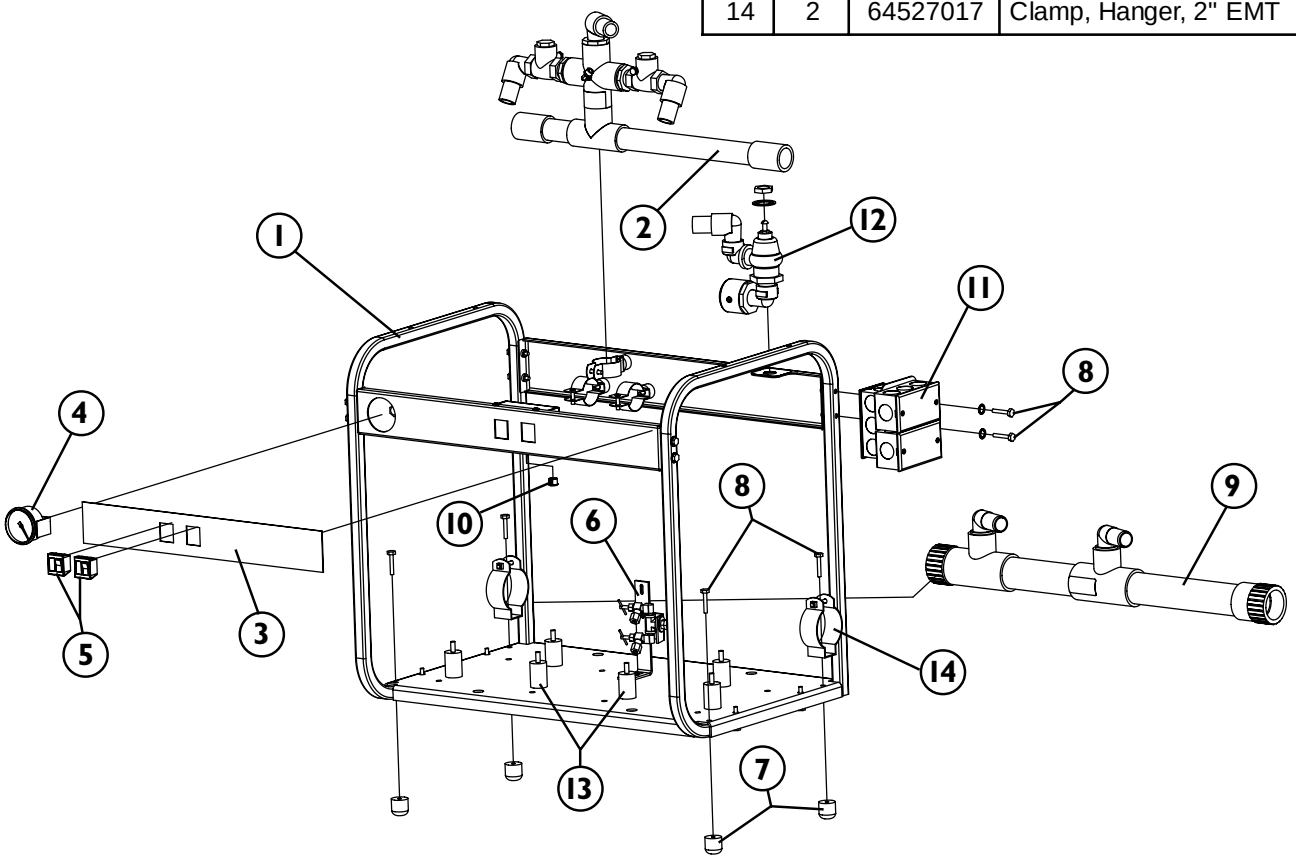


PARTS LISTS

Frame Assembly

The various parts of the CustomAir Dual Wet Vacuum Pump are attached to the frame assembly. The table identifies each assembly and the drawing indicates its location.

No.	Qty.	Part No.	Description
1	1		Enclosure, complete
2	1	64501451	Intake Manifold Assembly
3	1 1		MC 201 Decal or MC 202 Decal
4	1	64568134	Vacuum Gauge
5	2	64568132	Rocker Switch
6	1	64568163	Water Manifold Assembly
7	4	64568161	Dual PVC Foot
8	6	64611027	Dual Screw, 1-1/4"
9	1	64568162	Waste Manifold Assembly
10	1	64556016	Grommet, 1/2", white
11	1	64513026	Electrical Installation Kit
12	1	64501391	Vacuum Control Assembly
13	1	64568149	Motor Mount (pkg. of 4)
14	2	64527017	Clamp, Hanger, 2" EMT

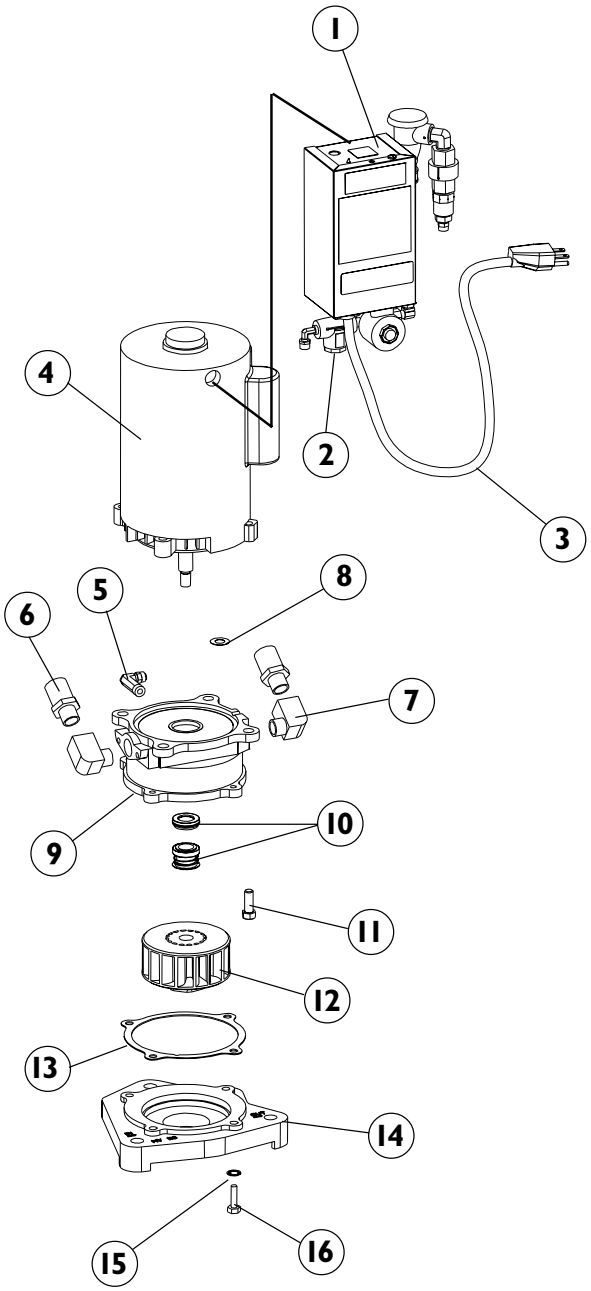


PARTS LISTS

1 HP Dual Pump Assembly

The CustomAir Dual Wet Vacuum Pump is powered by two water injected, impeller type vacuum pumps. This type of vacuum producer runs quietly and generates a high mercury pull, which is adjustable from a normal operating range of 10 to 12 inches of mercury to a high range of 18 to 20 inches of mercury for surgical applications. There are two vacuum pump sizes: the 1 HP (model MC-201 FS) and the 2 HP (model MC-202 FS, *illustrated on Page 58*). The dual pump back-up system and the choice of vacuum power ranges, make this a highly reliable and versatile evacuation system.

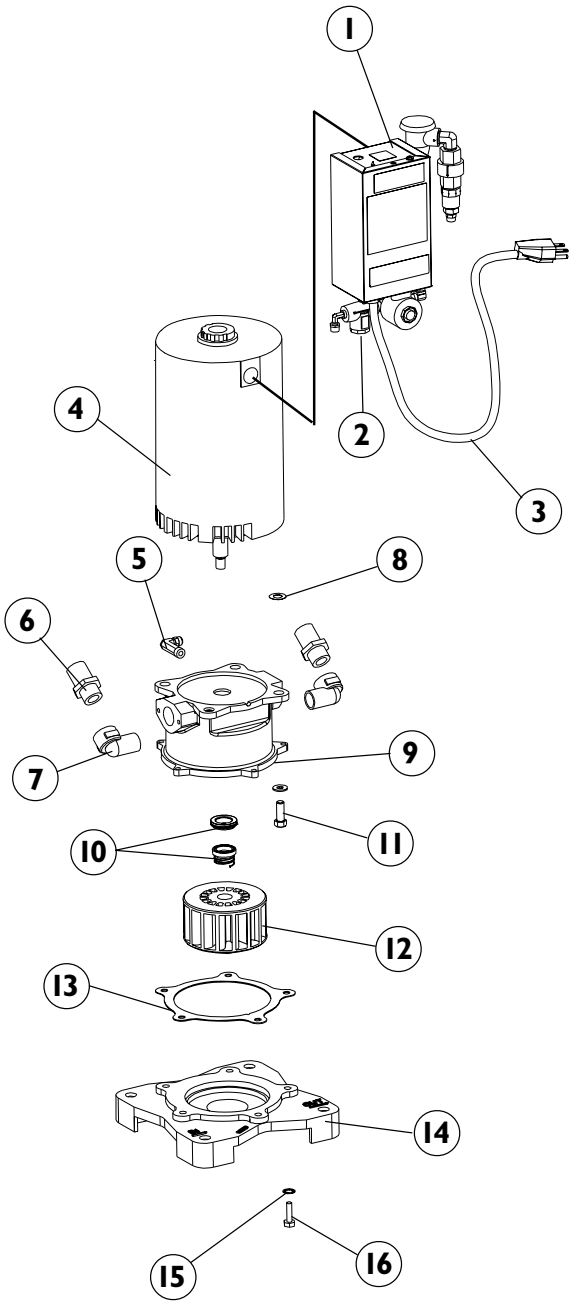
No.	Qty.	Part No.	Description
	1	64586801R	Dual Pump Assembly, 1 HP
1	1	64501153	Relay Unit, 230V
2	1	64568196	Water Manifold, 1/2 gallon
3	1	64532008	Electric Cord Assy., 230V
4	1	64575059	Motor, 1 HP, FS
5	1	64568155	Elbow, Brass, 1/4" x 1/4"
6	2	64568143	Adaptor, Brass, 1" hose x 1/2" MIP
7	2	64568139	Elbow, Brass, 1/2" Street
*8	As Req.	64604001 64604002 64604003 64604004 64604005	Shim, Steel .005 Thick Shim, Steel .031 Thick Shim, Steel .015 Thick Shim, Steel .002 Thick Shim, Steel .010 Thick
*9	1	64568199	Housing, Brass, 1 HP
*10	1	64568123	Rotary Water Seal (gasket included)
*11	4	1615-028	Cap Screw, 3/8" -- 16 x 1"
*12	1	64568198	Impeller, Brass, Balanced, 1 HP
*13	1	64568127	Housing Gasket, Fiber
*14	1	64568167	Base Plate, Brass, 1 HP
*15	4	64624016	Internal Star Washer, 5/16"
*16	4	64611044	Cap Screw, 5/16" -- 18 x 1"
*8-16	1	64568125	Lower Rebuild Kit, 1 HP



NOTE: *See the Operation/Maintenance section of this manual for detailed information on hookup and care of the Dual Wet Vacuum Pump.*

PARTS LISTS

2 HP Dual Pump Assembly

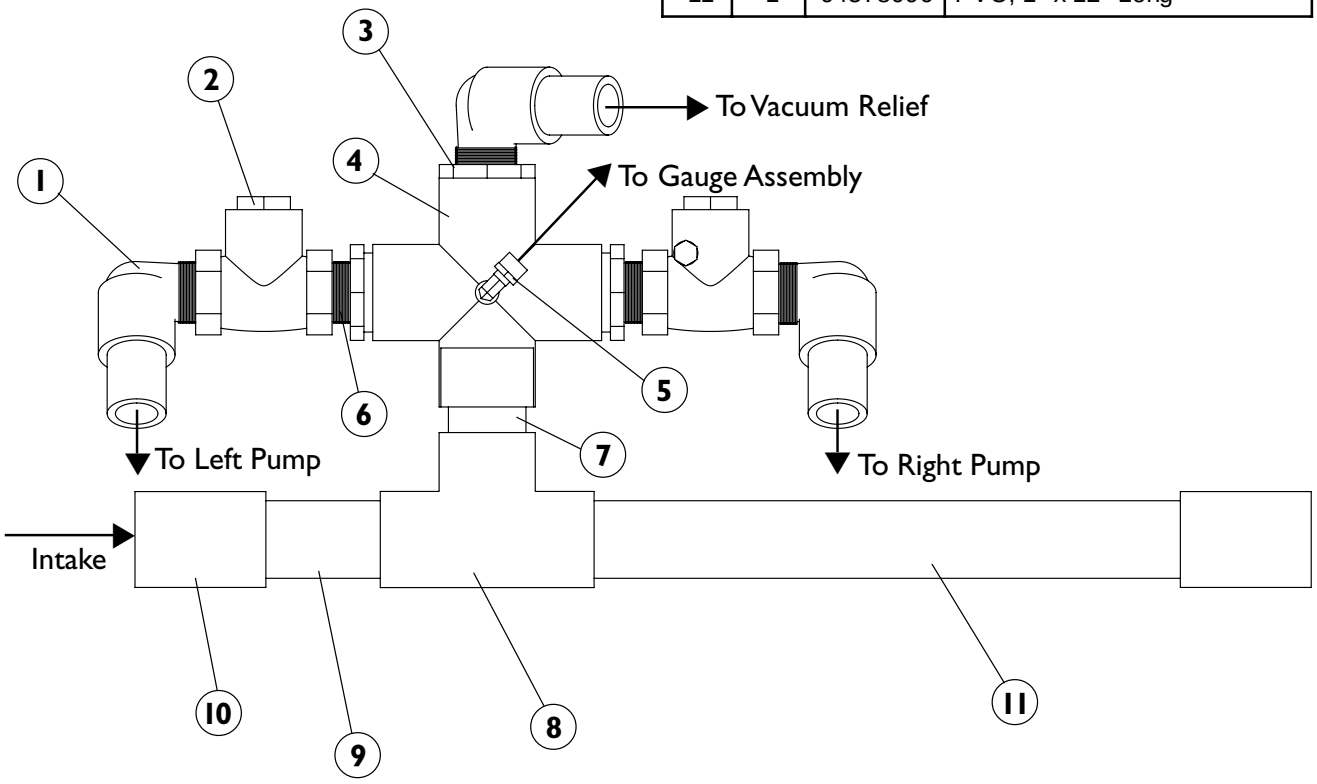


No.	Qty.	Part No.	Description
	1	64586802R	Dual Pump Assembly, 2 HP
1	1	64501158	Relay Unit, 230V
2	1	64568197	Water Manifold, 1 Gallon
3	1	64532008	Electric Cord Assy., 230V
4	1	64575060	Motor, 2 HP, FS
5	1	64568155	Elbow, Brass, 1/4" x 1/4"
6	2	64504087	Adaptor, Brass, 1" hose x 3/4" MIP
7	2	64568144	Elbow, Brass, 3/4" Street
*8	As Req.	64604001 64604002 64604003 64604004 64604005	Shim, Steel .005 Thick Shim, Steel .031 Thick Shim, Steel .015 Thick Shim, Steel .002 Thick Shim, Steel .010 Thick
*9	1	64568200	Housing, Brass, 2 HP
*10	1	64568124	Rotary Water Seal (gasket included
*11	4	1615-028	Cap Screw, 3/8" -- 16 x 1"
*12	1	64568189	Impeller, Brass, Balanced, 2 HP
*13	1	64568128	Housing Gasket, Fiber
*14	1	64568168	Base Plate Brass, 2 HP
*15	5	64624016	Internal Star Washer, 5/16"
*16	5	64611044	Cap Screw, 5/16" -- 18 x 1"
*8-16	1	64568126	Lower Rebuild Kit, 2 HP

Intake Manifold Assembly, Dual

The intake manifold swing-check valves provide automatic isolation for the back-up pump when it is not operating. This prevents vacuum loss through the exhaust of the standby pump. When both pumps are operating, the swing-check valves open to allow maximum air flow. The manifold is constructed of PVC and the valves are brass. Both materials are not affected by chemical disinfectants.

No.	Qty.	Part No.	Description
	1	64501451	Intake Manifold Assembly
1	3	64541117	Elbow, 3/4" NPT x 1" Shank
2	2	64568191 64568193	Swing Check Valve, 3/4" Swing Check Valve, 1"
3	3	64516006	Bushing, Reducer 1" Slip x 3/4" FIP
4	1	64537006	Cross, PVC 1" Slip
5	1	64541004	Elbow, Brass, 1/4" Tube x 1/8" MIP
6	3	64568142	Nipple, Brass, 3/4" Close
7	1	64578098	PVC, 1" x 2" Long
8	1	64616008	Tee, 1" Slip
9	1	64578097	PVC, 1" x 4" Long
10	2	64504029	Adaptor, PVC, 1" FIP x 1" Slip
11	1	64578096	PVC, 1" x 12" Long

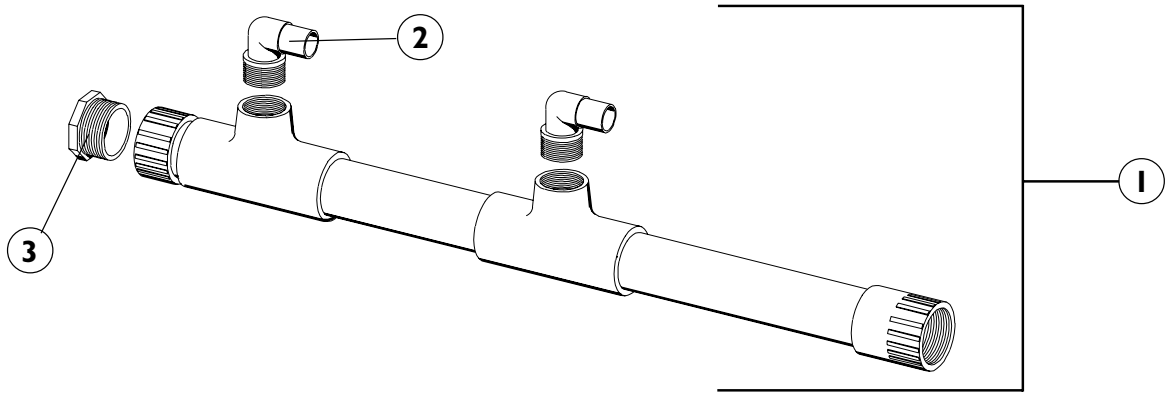


PARTS LISTS

Exhaust Manifold Assembly, Dual

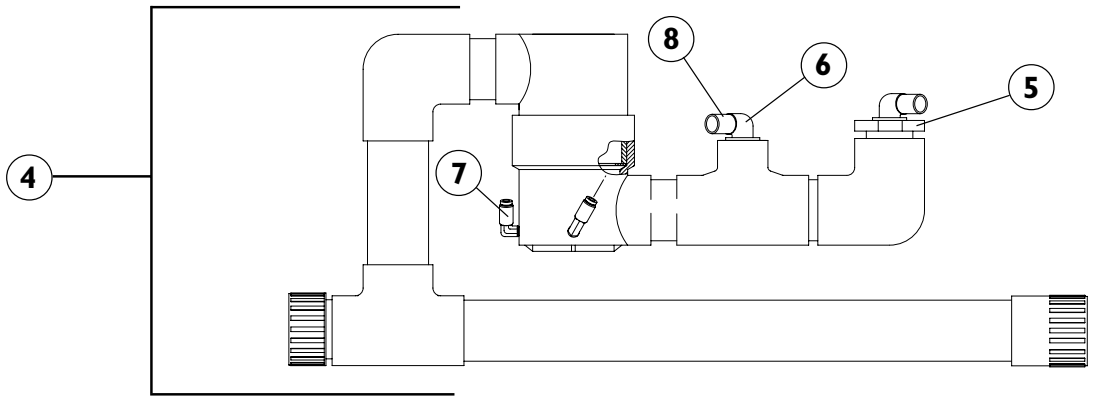
The exhaust manifold delivers liquid waste materials from both pumps to the drain line. The manifold is constructed of PVC to prevent chemical corrosion and buildup of organic and mineral wastes. The exhaust muffler connected to the drain line outside the cabinet assures quiet operation.

No.	Qty.	Part No.	Description
1	1	64568162	Std. Exhaust Manifold Assy.
2	2	64541134	Elbow, Brass, 1" MIP x 1" Shank
3	1	64584024	Plug, PVC, 1-1/2" MIP

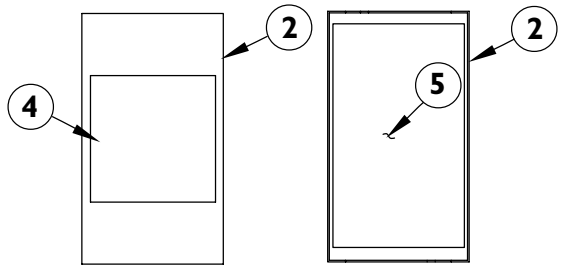


Water Recirculator Exhaust Manifold Assembly (Optional)

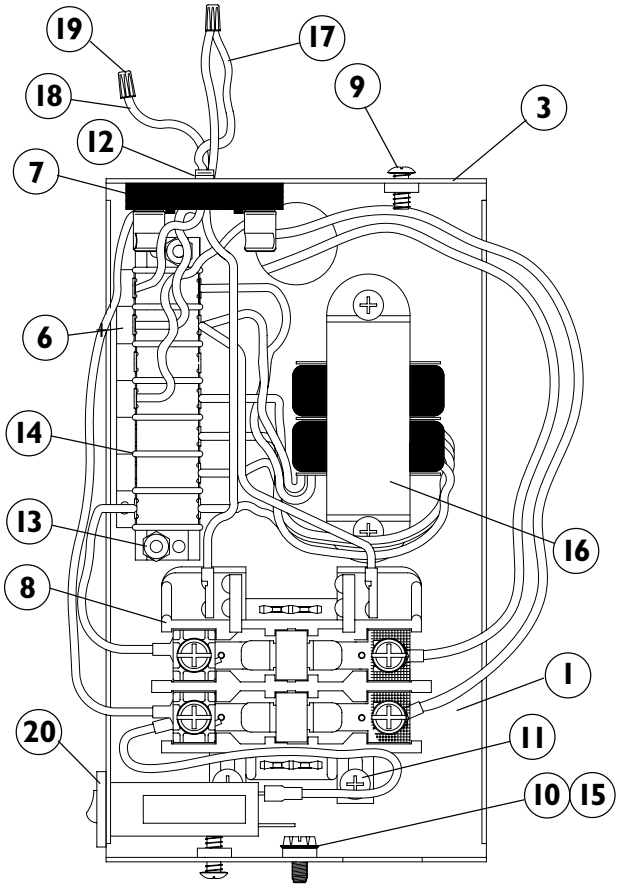
No.	Qty.	Part No.	Description
4	1	64501122	Water Recirculator Exhaust Manifold Assembly (Optional)
5	1	64516031	Bushing Reducer, 1-1/2" SLIP x 1" FIP
6	2	64541134	Elbow, Brass, 1" NPT
7	2	64541121	Elbow, 1/4" Poly x 1/8" MIP
8	2	64504121	Adaptor, 1" Hose



Electrical Box



No.	Qty.	Part No.	Description
	1	64501150	Electrical Box Assembly, 115V or 230V
1	1	64513011	Control Box Chassis
2	1	64513011B	Control Box Cover
3	1	64529027	Decal, Low, 24V
4	1	64529174	Decal, Fire/Shock Warning
5	1	64529182	Decal, D V Elec. Diagram
6	1	64529185	Decal, D V Terminal Block
7	1	64561004	Fuse Clip Holder
8	1	64568133	Relay, 30 AMP Capacity
9	2	1623-054	Screw, 10-32 x 1/2"
10	1	64611060	Screw, 10-32 Green, Ground
11	4	64611085	Screw, 8 x 1/4" Phillips
12	1	64611119	Screw, 6-32 x 5/16", Fuse Holder
13	2	64611120	Screw, 6-32, Terminal Board
14	1	64615023	Terminal Board, 7 Quik Connect
15	1	1636-026	Lock Washer, #10 Int'l star
16	1	64568195	Primary Transformer, 115/230V
17	1	64529025	Decal, Caution Low Volts
18	1	64529203	Tag, Wire Usage Warning
19	2	64626003	Wire Nut, Ideal, 71-B Gray
	1	64618068	Conduit, Black
	1	64624058	Washer, 7/8"
	2	64578001	Nipple, Chase, 1/2"
*	1	64501153	Electrical Box Assembly Kit, 115/230V (1HP)
*	1	64501158	Electrical Box Assembly Kit, 230V (2 HP)
20	1	3802-120	Circuit Breaker 15 Amp
20	1	3801-911	Circuit Breaker, 8 Amp



No.	Qty.	Part No.	Description
	1	64532008	Cord, 230V
	1	64529186	Decal, Fuse Replacement 3/10A, 115V or
	1	64529187	Decal, Fuse Replacement 15/100A, 230V
	1	2679-497	Decal, Ground
	1	64529125	Decal, 230V, 7.5A, 60 Hz (1 HP Dual) or
	1	64529126	Decal, 230V, 15A, 60 Hz (2 HP)
	1	64531025	Connector, Snap-in, Black
	1	64579001	Nut, Locking, 1/2"
	1	64568131	Fuse, 3/10 Amp, Slo-Blo, 115V (pkg. of 4) or
	1	64568130	Fuse, 15/100 Amp, Slo-Blo, 230V (pkg. of 4)

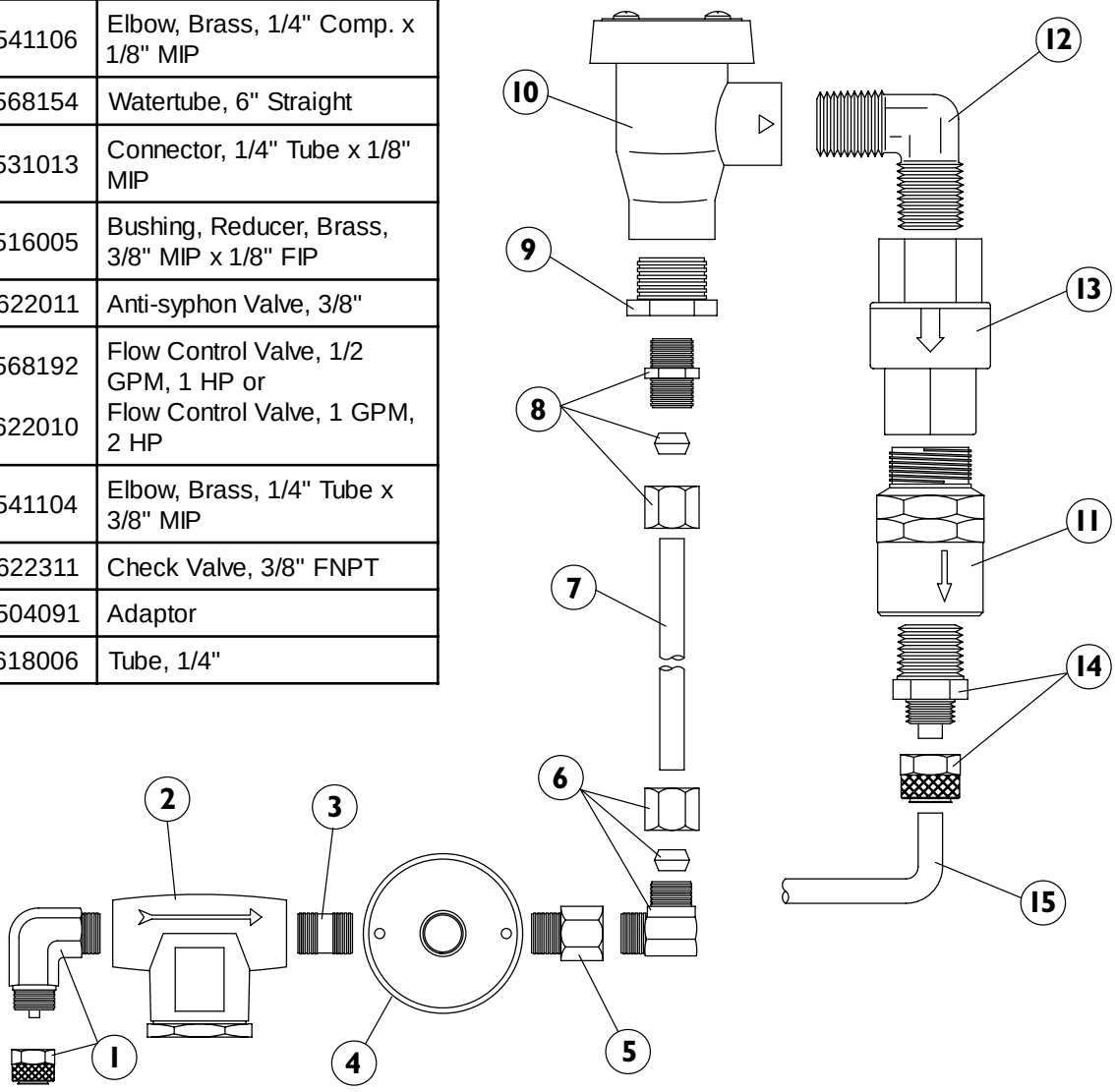
***NOTE:** *Electrical Box Assembly Kits: PN 64501153, 230V (1 HP) and PN 64501158, 230V (2 HP) are complete with water manifold attached.*

PARTS LISTS

Water Control Assembly

No.	Qty.	Part No.	Description
	1 1	64568196 64568197	Water Control Assy., 1 HP Water Control Assy., 2 HP
1	1	64541004	Elbow, Brass, 1/4" Tube x 1/8" MIP
2	1	64568135	Water Filter, 1/8"
3	1	64578002	Nipple, Brass, 1/8" MIP
4	1	64568156	Solenoid Valve
5	1	64504072	Adapter, Brass, 1/8" MIP x 1/8" FIP
6	1	64541106	Elbow, Brass, 1/4" Comp. x 1/8" MIP
7	1	64568154	Watertube, 6" Straight
8	1	64531013	Connector, 1/4" Tube x 1/8" MIP
9	1	64516005	Bushing, Reducer, Brass, 3/8" MIP x 1/8" FIP
10	1	64622011	Anti-syphon Valve, 3/8"
11	1	64568192 64622010	Flow Control Valve, 1/2 GPM, 1 HP or Flow Control Valve, 1 GPM, 2 HP
12	1	64541104	Elbow, Brass, 1/4" Tube x 3/8" MIP
13	2	64622311	Check Valve, 3/8" FNPT
14	1	64504091	Adaptor
15	1	64618006	Tube, 1/4"

The water control system of the CustomAir Dual Wet Vacuum Pump provides the pumps with the water flow required for proper suction and sopplemental cooling. Automatic and independent water control is provided for each pump. Filters protect the system from damage due to solid materials in the water supply. Flow valves control the amount of water supplied to each pump.

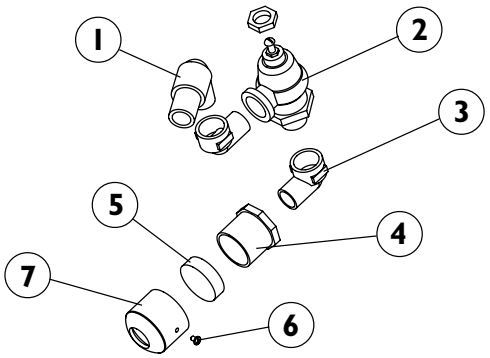


PARTS LISTS

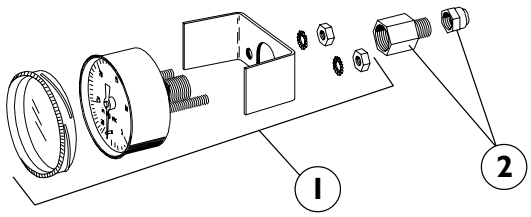
Vacuum Control Assembly

No.	Qty.	Part No.	Description
	1	64501391	Vacuum Control Assembly
1	1	64541117	Elbow, PVC, 3/4" MIP x 1" Shank
2	1	64622001	Vacuum Relief Valve
3	2	64541016	Elbow, Brass, Street 3/4"
4	1	64516008	Bushing, PVC, 1-1/4" Slip x 3/4" FIP
5	1	64568145	Filter Element, Vacuum Relief Valve
6	1	64611085	Screw, 8 x 1/4" Phillips
7	1	64521009	Cap, PVC, 1-1/4"

The vacuum control assembly is attached to the central section of the front control panel. The valve in this assembly provides automatic regulation of the vacuum flow in the system. The vacuum level can be adjusted for different system requirements. The vacuum gauge is connected to a fitting on this assembly.



Vacuum Gauge and Adapter

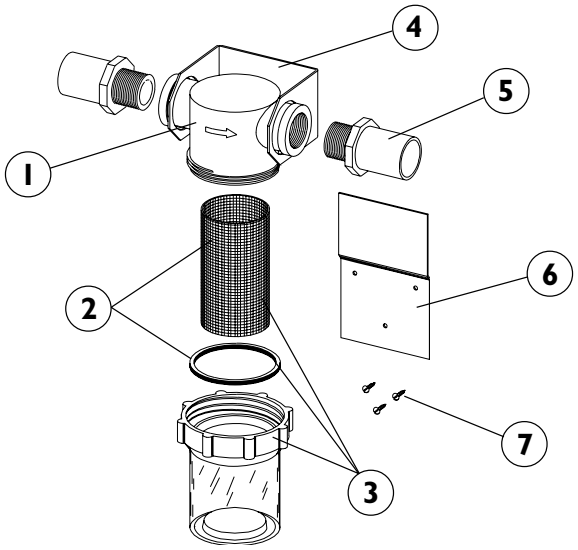


No.	Qty.	Part No.	Description
1	1	64568134	Vacuum Gauge Assembly
2*	1	64531008	Adapter, 1/4" FIP x 1/4" Poly

NOTE: **Not included in assembly.*

In-Line Filter Assembly, 1"

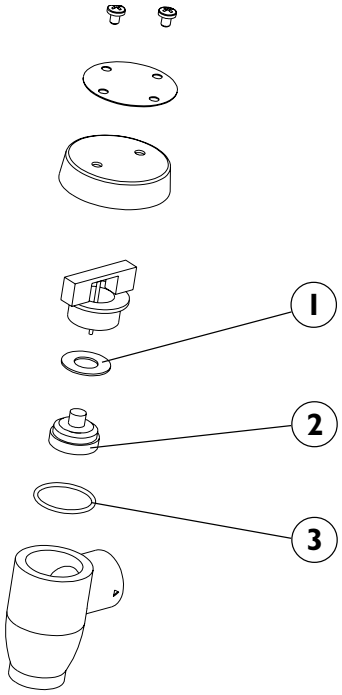
No.	Qty.	Part No.	Description
	1	64501940	In-LIne Filter Assembly, 1"
1	1	64509017	In-Line Filter Body, 1"
2	1	64568121	Screen, 1", 20 Mesh, 2-1/4" D x 4-1/4" L, & Gasket
3	1	64568122	Screen, 1", 20 Mesh, 2-1/4" D x 4-1/4" L, Gasket & Bowl, 1" In-Line Filter, Clear
4	1	64514041	Bracket, 1" In-Line Filter, older
5	2 2	64568153 64504103	Adapter, PVC 1" MIP x 1-1/2" Shank or Adapter, PVC 1" MIP x 1" Shank
6	1	64514042	Bracket, In-Line Filter Wall Mount
7	3	64611007	Screw, 10 x 1/2" Pan Slot



PARTS LISTS

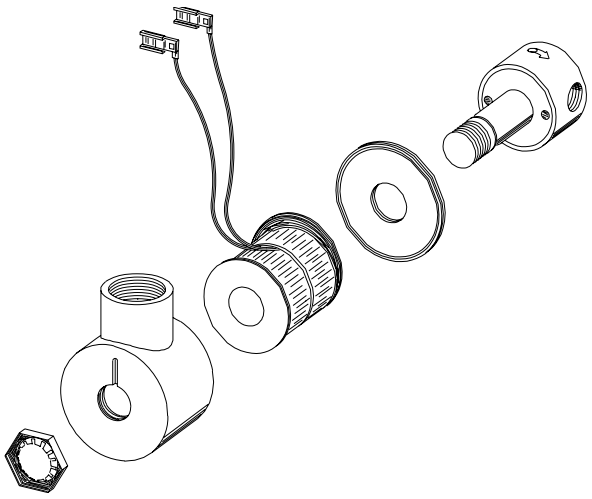
Anti-Siphon Valve Assembly

No.	Qty.	Part No.	Description
	1	64622011	Anti-Siphon Valve Assembly
1,2,3	1	64568016A	Anti-Siphon Repair Kit



Water Solenoid Valve Assembly

No.	Qty.	Part No.	Description
	1	64568156	Water Solenoid Valve Assembly



PARTS LISTS

2500 Highway 31 South
Bay Minette, Alabama 36507
1-866-DTE-INFO
Fax: (251) 937-0461
www.dentalez.com

Printed in USA
January, 2010